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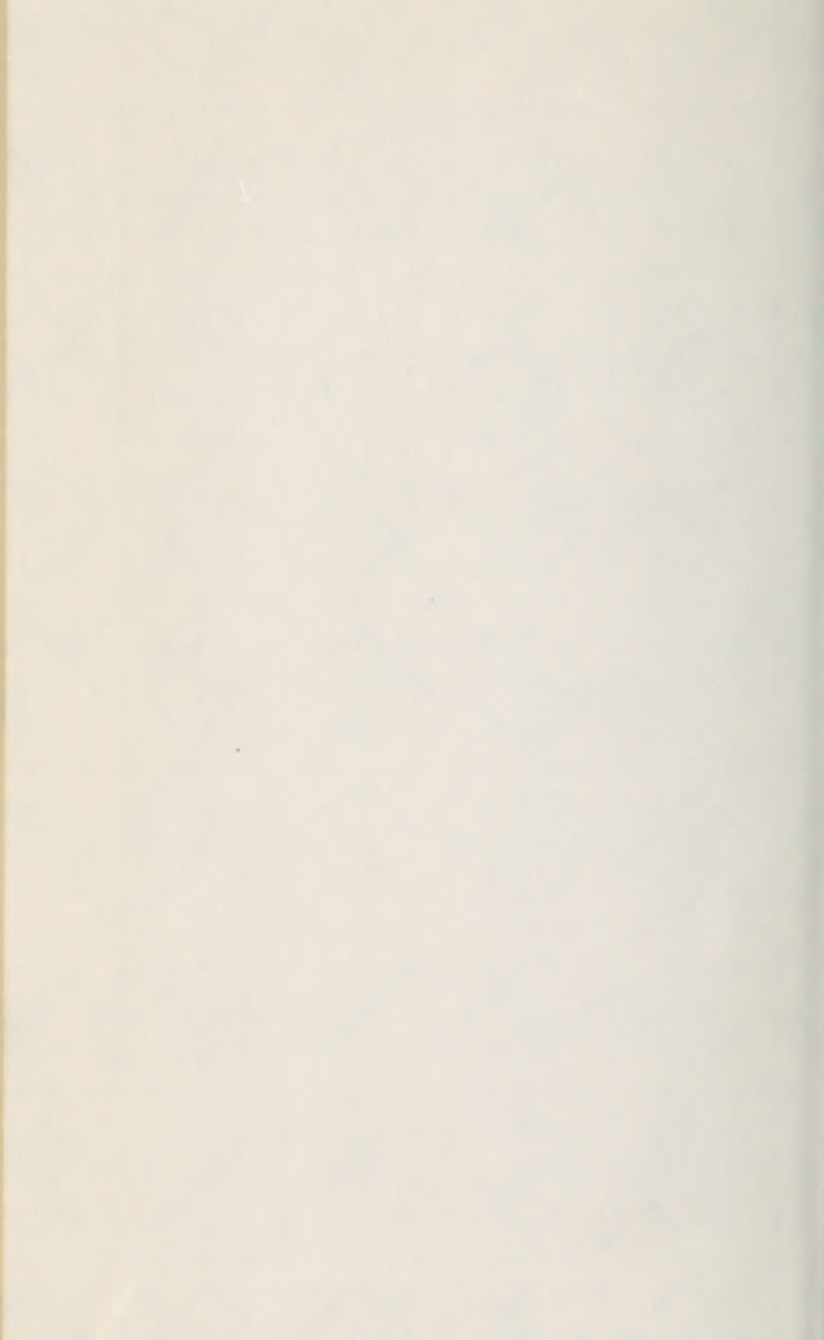


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THE ESSENTIALS OF MATERIA
MEDICA AND THERAPEUTICS

BY

JOHN FOOTE, M.D.

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ing School for Nurses*

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OF
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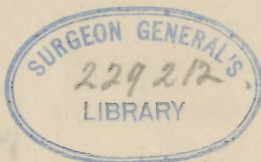
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MEDICA AND THERAPEUTICS, PROVIDENCE HOSPITAL TRAIN-
ING SCHOOL FOR NURSES

THIRD EDITION, REVISED, ENLARGED AND RESET



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J. B. LIPPINCOTT COMPANY

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PREFACE TO THE THIRD EDITION

THE gratifying reception accorded this small text-book, attested by numerous reprintings and two editions, have encouraged the writer and the publishers to issue a new, completely revised edition, conforming to the standards of the U. S. Pharmacopœia, IX Revision. In addition, the opportunity has been taken to embody many suggestions received from Training School Superintendents in adapting this work to the practical needs of the student-nurse, as well as the deductions drawn from an exhaustive study of the requirements of the State Examining Boards for Nurses, as shown in the questions submitted by thirty such organizations in the last two years. The Latin official names of drugs and preparations have been added in this revision, and in the Reference Table the official name of each drug or preparation recognized in the European pharmacopœias is included—this last as a result of an unanticipated foreign demand for the earlier editions. A rearrangement of the drug classification, the addition of new material, especially concerning the newer remedies, amplified sections on the mathematics of solutions and fractional dosage, and the introduction of much general reference material, including formulas of preparations useful in hospital and private nursing, as well as condensed information about the newer antiseptics used in European military surgery, practical disinfection, toxicology and therapeutic action, have added to the bulk of the volume, without, we hope, seriously impairing its original virtue of compactness and simplicity. The “U. S. Pharmacopœia,” “New and Non-Official Remedies,” and Wood’s “Pharmacology and Therapeutics,” have been used freely in this revision, as authorities.

March, 1918

J. F.

PREFACE

THIS little work is intended to simplify the study of therapeutics for nurses by limiting the number of important remedies to be studied and appending a reference list to cover the other frequently used drugs and preparations. The physiological action described in the second part is based on experimental pharmacology, and is, therefore, not in conflict with the therapeutic applications of the remedies considered. In the reference table, the "Pharmacopœia," "Merck's Index," "The Manual of Therapeutics, Relating Especially to Biological Products," and various other sources have been freely used to make a suitable list.

The more ambitious text-books for nurses are based on a classification according to chemical and botanical groups. This, it seems to me, is needless, and imposes upon the student the task of culling the necessary knowledge from a confusing mass of facts. For this reason the author has considered a list of drugs, necessarily limited, in his lectures to students of medicine and nursing, and these lecture notes have furnished a basis for the present work. Special attention has been given to the untoward action of drugs, to aid the nurse in noting and recording these actions when they occur. Acknowledgment is due to Dr. R. M. Le Comte for assistance in preparing the manuscript, and to the Sister Superintendent of Nurses of Providence Hospital Training School for suggestions as to the scope of the work.

J. F.

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PART I

DEFINITIONS AND WEIGHTS—DOSAGE—
METHODS OF ADMINISTERING MEDICINES
—THE PREPARATION OF ANTISEPTIC AND
OTHER SOLUTIONS—HOW MEDICINES ACT.

MATERIA MEDICA AND THERAPEUTICS

CHAPTER I

DEFINITIONS AND WEIGHTS

DEFINITIONS

MATERIA MEDICA (medical material) treats of the natural and commercial history of drugs, their physical and chemical properties, and their doses.

THERAPEUTICS treats of the action of medicines in relieving or curing disease.

A REMEDY is an agency used in the treatment of disease.

A MEDICINE is any substance used in the treatment of disease.

A DRUG is any raw material used to compose or compound a medicine. (A REMEDY may be a drug, a medicine, or an agency such as electricity, sunshine, or bathing.)

A PRESCRIPTION is a written order for a remedy addressed to a pharmacist. In a prescription the sign *R*, an abbreviation of the Latin *recipe* (*take*), appears first, followed by the names of the ingredients written in Latin and the quantities expressed in a standard system of weights and measures. The directions to the pharmacist are also written in Latin. The directions to the patient are written in English or the language the patient speaks.

Example of a prescription;

In Latin:

R

Sodii Bromidi

Aquæ

Syrupi quantum sufficiat ad

Misce. Signetur:

One teaspoonful every three hours.

JOHN SMITH, M.D.

In English:

Take

of bromide of soda, one drachm

of water, one-half an ounce

of syrup, a sufficient quantity to

make two ounces.

Mix. Write.

One teaspoonful every three hours.

JOHN SMITH, M.D.

PRESCRIPTION LATIN

The following Latin terms, or their abbreviations, have long been used in writing prescriptions. Many of the phrases are practically obsolete nowadays.

<i>Ad</i>	<i>Ad</i>	To, or up to.
<i>Ad lib</i>	<i>Ad libitum</i>	At pleasure.
<i>Admov.</i>	<i>Admoveatur</i>	Apply.
<i>Alt. hor.</i>	<i>Alterius horis</i>	Every other hour.
<i>A. or aa.</i>	<i>Ana</i>	Of each.
<i>Aq. bull.</i>	<i>Aqua bulliens</i> ..	Boiling water.
<i>Aq. ferv.</i>	<i>Aqua fervens</i>	Hot water.
<i>Aq. font.</i>	<i>Aqua fontana</i>	Spring water.
<i>Arg.</i>	<i>Argentum</i>	Silver.
<i>Au.</i>	<i>Aurum</i>	Gold.
<i>Aut.</i>	<i>Aut</i>	Or.
<i>Bene.</i>	<i>Bene</i>	Well.
<i>Bib.</i>	<i>Bibe</i>	Drink.

<i>Bis</i>	<i>Bis</i>	Twice.
<i>B. i. d.</i>	<i>Bis in die</i>	Twice a day.
<i>Bull.</i>	<i>Bulliat</i>	Let it boil.
<i>C.</i>	<i>Cum</i>	With.
<i>Cap.</i>	<i>Capiat</i>	Let him take.
<i>Capsul.</i>	<i>Capsula</i>	A capsule.
<i>Chart.</i>	<i>Charta</i>	Paper.
<i>C. m.</i>	<i>Cras mane</i>	To-morrow morning.
<i>C. n.</i>	<i>Cras nocte</i>	To-morrow night.
<i>Coch. parv.</i>	<i>Cochleare parvum</i> ..	A teaspoonful.
<i>Coch. amp.</i>	<i>Cochleare amplum</i> ..	A dessertspoonful.
<i>Coch. mag.</i>	<i>Cochleare magnum</i> ..	A tablespoonful.
<i>Cong.</i>	<i>Congius</i>	A gallon.
<i>Dil.</i>	<i>Dilue</i>	Dilute.
<i>D. in p.</i>	$\left\{ \begin{array}{l} \textit{Dividatur in partes} \\ \textit{æquales} \end{array} \right.$	$\left. \begin{array}{l} \text{Let it be divided into} \\ \text{equal parts.} \end{array} \right\}$
<i>Emp.</i>	<i>Emplastrum</i>	A plaster.
<i>F. pil. xii.</i>	<i>Fac pilulas duodecim.</i>	Make twelve pills.
<i>Ft.</i>	<i>Fiat</i>	Let it be made.
<i>Filt.</i>	<i>Filtra</i>	Filter.
<i>Gtt.</i>	<i>Guttæ</i>	Drops.
<i>Hor. som.</i>	<i>Hora somni</i>	At the hour of sleep.
<i>Mane</i>	<i>Mane</i>	In the morning.
<i>M.</i>	<i>Misce</i>	Mix.
<i>O. D.</i>	<i>Oculus dexter</i>	Right eye.
<i>O. S.</i>	<i>Oculus sinister</i>	Left eye.
<i>Omn. hor.</i>	<i>Omni hora</i>	Every hour.
<i>Post cib.</i>	<i>Post cibum</i>	After eating.
<i>Q. S.</i>	<i>Quantum sufficiat</i> ..	A sufficient quantity.
<i>Red. in pulv.</i>	<i>Redactus in pulverem</i> }	$\left. \begin{array}{l} \text{Let it be reduced to} \\ \text{powder.} \end{array} \right\}$
<i>Sig.</i>	<i>Signetur</i>	Let it be labeled.
<i>Tab.</i>	<i>Tabella</i>	A lozenge, or tablet.
<i>T. i. d.</i>	<i>Ter in die</i>	Three times a day.
<i>Ter. sim.</i>	<i>Tere simul</i>	Rub together.
<i>Trit.</i>	<i>Tritura</i>	Triturate.
<i>Ut dict.</i>	<i>Ut dictum</i>	As directed.

PHARMACY treats of the preparation of drugs and medicines so that they may be most efficacious and least disagreeable.

The PHARMACOPŒIA is a book compiled by authorities in medicine and pharmacy as a national standard for the purity and accuracy of drugs and medicines. The book gives names and descriptions of crude drugs, tests for purity, and doses and formulæ for certain standard *preparations*. Drugs and preparations included in the Pharmacopœia are said to be "official."

COMMONLY USED PREPARATIONS OF THE PHARMACOPŒIA.

WATERS (AQUÆ) are weak solutions of volatile substances (as oil of peppermint) in water. They are used principally as flavoring agents.

SOLUTIONS (LIQUORES) are powerful solutions of non-volatile substances (chemicals such as arsenic, chloride of iron, etc.) in water. They are usually potent remedies.

SYRUPS (SYRUP) are solutions of sugar in water, usually with medicinal substances added (as syrup of tar).

SPIRITS (SPIRITI) are solutions of volatile substances (camphor, oil of peppermint, etc.) in alcohol.

ELIXIRS (ELIXIRES) are sweetened aromatic preparations containing alcohol and other medicinal substances.

MIXTURES (MISTURÆ) are watery preparations containing finely divided solid matter, not dissolved but in suspension.

EMULSIONS (EMULSÆ) are milk-like preparations in which oily matter is held in suspension by the aid of some viscid substance.

INFUSIONS (INFUSÆ) are preparations made by extracting the properties of vegetable drugs with hot water. Example—tea.

TINCTURES (TINCTURÆ) are preparations of vegetable drugs, not weaker than 10 per cent., made by extracting the properties of the drug with an alcoholic liquid.

FLUIDEXTRACTS (FLUIDEXTRACTA) resemble tinctures but are of 100 per cent. strength.

EXTRACTS (EXTRACTA) are made like fluidextracts, but the alcoholic medium has been evaporated so that the product is a solid or semi-solid mass.

POWDERS (PULVERES) are mixtures of powdered drugs intended for internal use. Example—Seidlitz powders.

PILLS, CAPSULES, TABLETS, CACHETS, etc., are various devices for giving single doses of solid drugs in an acceptable form.

SUPPOSITORIES are suitably-shaped medicated solids, which melt at the body temperature, intended to be inserted into the rectum or other apertures of the body.

OINTMENTS (UNGUENTA) are fatty medicated substances which melt at body temperature, intended principally for local action.

LINIMENTS (LINIMENTA) are oily liquids for external use, to be applied with friction.

PLASTERS (EMPLASTRA) are semisolid medicated substances, spread on a fabric, which adhere to the body at the body temperature.

WEIGHTS AND MEASURES

Two systems of weights and measures are employed by physicians and pharmacists. The old or *apothecaries' system* is best known and most generally employed in English-speaking countries. The *metric* or *decimal system*, corresponding to our system of currency, has many advantages, and is employed in the Pharmacopœia and generally used in Europe.

Each system has a *unit*, and this *unit* is the starting point or quantity in each system, which, *when multiplied or divided*, gives the *greater or lesser quantities or weights* of that system. The *unit* of the apothecaries' system is the *grain*; of the metric system, the *gramme*.

APOTHECARIES' WEIGHT AND MEASURE

In this system the unit of weight is the *grain*; the unit of capacity is the *minim*. Certain symbols are used to designate the various quantities. The *minim* of water at ordinary temperatures weighs *one grain*.

The *symbol* of the *grain* is *gr*. The *symbol* of the *minim* is $\mathfrak{m}$.

APOTHECARIES' WEIGHT

Twenty grains make one scruple.

$\text{gr.}\text{xx}$ $=$ $\mathfrak{d}\text{i}$

Three scruples make one drachm.

$\mathfrak{d}\text{iii}$ $=$ $\mathfrak{z}\text{i}$

Eight drachms make one ounce.

$\mathfrak{z}\text{viii}$ $=$ $\mathfrak{z}\text{i}$

Twelve ounces make one pound.¹

$\mathfrak{z}\text{xii}$ $=$ $\text{lb.}\text{i}$

APOTHECARIES' MEASURE

Sixty minims make one fluidrachm.

$\mathfrak{m}\text{lx}$ $=$ $\mathfrak{z}\text{i}$ or $\text{fl.}\mathfrak{z}\text{i}$

Eight fluidrachms make one fluidounce.

$\mathfrak{z}\text{viii}$ $=$ $\mathfrak{z}\text{i}$

Sixteen fluidounces make one pint.

$\mathfrak{z}\text{xvi}$ $=$ Oi

¹ The pound is seldom used.

Thus it will be seen that, omitting the scruple and the pint, the quantities and the symbols are the same in both the apothecaries' weight and measure. An ordinary *drop of water* at 60° F. temperature is about *one minim*. The symbol *gtt.* (abbreviation of *gutta*) indicates the *drop*. The drop does not correspond to the minim in fluids heavier or lighter than water. The abbreviation *ss* means *one half*. Thus, *gr. vss* reads grains five and a half.

It will be observed that in this system the quantities are written in Roman numerals, as on a clock dial. Also that the symbol is written *before* the quantity—as *gr. xviii*, not *18 gr.* In the metric system ordinary numerals are used and the symbol is written *after* the quantity.

THE METRIC SYSTEM

In this system the unit of *capacity*, for all practical purposes, is the *cubic centimetre (c.c.)*, or as it is now known the *millilitre (mil)*; the unit of *weight*, the *gramme (Gm.)*. In the metric system, however, the unit of *length* is the *metre*, a measure a little greater than *thirty-nine inches*. In multiplying this unit, we simply say, one, ten, or several hundred metres (abbreviation *M.*), writing the symbol *AFTER* the quantity. When a thousand metres is reached we call it a *kilometre* or *kilo*, and we multiply all the other units,—grammes and cubic centimetres,—in the same manner.

In *dividing* the *metre*, and, likewise, all the other units of the metric system, we do so by *decimals*, in the *tenths*, *hundredths*, or *thousandths*. For example, in the old system we may write " $\frac{1}{10}$ of an inch," or "*gr.* $\frac{1}{4}$ " if it be a fraction of the unit of weight. In the metric system we write

1 M. (metre).

0.1 M. would be read 1 decimetre.

0.01 M. would be read 1 centimetre.

0.001 M. would be read 1 millimetre.

It will be easily seen that 0.1 M. is 10 centimetres or 100 millimetres. The centimetre, the measure most used, is roughly $\frac{2}{5}$ of an inch.

To make this plainer, let us take our currency system. The dollar is the unit. Supposing we have \$1.25. We would read one dollar and twenty-five cents, not one dollar and 250 mills or one dollar two dimes and five cents. And, so, if for dollars we substitute metres, grammes or cubic centimetres (the units of measure, weight, and capacity of the metric system) we would read "one metre and twenty-five centimetres," or "one gramme and twenty-five centigrammes," or "one mil and twenty-five centimils."

So it is sufficient to remember that:

1000 $\left\{ \begin{array}{c} \text{metres} \\ \text{or} \\ \text{grammes} \end{array} \right\}$ make a kilo- $\left\{ \begin{array}{c} \text{metre} \\ \text{or} \\ \text{gramme} \end{array} \right\}$

1000 cubic centimetres or millilitres make a litre.

That

$\frac{1}{10}$, $\frac{1}{100}$, and $\frac{1}{1000}$ of a $\left\{ \begin{array}{c} \text{metre} \\ \text{or} \\ \text{gramme} \end{array} \right\}$ is one $\left\{ \begin{array}{c} \text{deci-} \\ \text{centi-} \\ \text{milli-} \end{array} \right\}$ $\left\{ \begin{array}{c} \text{metre} \\ \text{or} \\ \text{gramme} \end{array} \right\}$
 $\left. \begin{array}{l} \frac{1}{10} \\ \frac{1}{100} \\ \frac{1}{1000} \end{array} \right\}$ of a cubic centimetre or millilitre are not read

as if they were written in fractions; not "a decicubic centimetre" but "decimil," "centimil," or "millimil." The equivalent of one mil in minims is 16.23. One gramme in grains is 15.48+. Equivalent of one grain in grammes is

.0648+. The equivalents in the following rules are exact enough for ordinary purpose, however.

TO CONVERT WEIGHTS OF THE APOTHECARIES' SYSTEM INTO THE METRIC SYSTEM

I. *Multiply the quantity of grains or minims by 0.06 to give Gm. or mil.*

II. *Multiply the number of fluid or liquid drachms by 4 to give Gm. or mil.*

III. *Multiply the number of ounces by 30 to give Gm. or mil.*

Examples.—How many Gm. in gr. x of Dover's powder?
Rule I.— $0.06 \times 10 = .6$ Gm.

How many mils in fl.ʒx of paregoric? Rule II.— $4 \times 10 = 40$ mils.

How many mils in ʒii of alcohol? Rule III.— $30 \times 2 = 60$ mils.

TO CONVERT THE METRIC SYSTEM INTO THE OLD SYSTEM

I. *Multiply decimals of three figures (as milligrammes) by $\frac{1}{60}$ to obtain grains or minims.*

II. *Multiply grammes, cubic centimetres and their decimals by 15 to obtain grains or minims.*

III. *Divide grammes, cubic centimetres and their decimals by 4 to obtain drachms, fluid or solid.*

IV. *Multiply litres by 2.1 to obtain pints.*

Examples.—A physician writes, "Morphine sulphate, .006 Gm." What part of a grain is this? Rule I.—.006 is six milligrammes; $6 \times \frac{1}{60} = \frac{6}{60}$ or gr. $\frac{1}{10}$.

Spiritus Ammonizæ Aromatica, 1.2 mils. How many minims is this? Rule II.— $1.2 \times 15 = 18$ minims.

Sugar of milk, 16 Gm. How many drachms is this?
Rule III.— $16 \div 4 = 4$ or ʒiv .

A patient is directed to take five litres of milk a week.
How many pints? Rule IV.— $2.1 \times 5 = 10.5$ or Oxss .

DOMESTIC EQUIVALENTS IN MEASURE

(A drop of water at ordinary temperature weighs a grain and measures a minim.)

1 drop (abbreviation is gtt.)...	℥i or 0.06 mil.
1 teaspoonful	ʒi or 4 mil.
1 dessertspoonful	ʒii or 8 mil.
1 tablespoonful	ʒss or 16 mil.
1 wineglassful	ʒii or 64 mil.

QUESTIONS

1. Define a remedy; an "official" preparation. What is the difference between a water and a spirit? between a solution and a mixture? between an infusion and a tincture? How do tinctures differ from fluidextracts and extracts?

2. What are the units of weight and capacity of the apothecaries' system? of the metric system? Write, properly, the sign for the units of both systems and their abbreviations. How are these units divided and multiplied to obtain the other quantities? Write the table for each system.

3. Write the three rules for converting the apothecaries' into the metric and give an example of the application of each. Write the four rules for converting metric quantities into the old system and give an example of each.

4. Give the equivalents in the metric and old system of a drop, a teaspoonful, dessertspoonful, tablespoonful wineglassful. Write the quantities in each system.

CHAPTER II

DOSAGE

DOSAGE is modified and is greater or lesser, depending on various conditions.

CONDITIONS WHICH MODIFY DOSAGE

1. **Age and Weight.**—a. Large and heavy individuals require larger doses than small persons.
- b. Females require, generally, smaller doses than males.
- c. The young and very old require smaller doses than the adult.

RULES TO DETERMINE FRACTIONAL DOSES FOR CHILDREN

YOUNG'S RULE consists in using the age at nearest birthday for the numerator, and the age plus twelve for the denominator of the fraction.

Example.—What is the dose of Basham's mixture for a child of eight. Taking the child's age, eight, and adding 12, we have 20, the denominator, and 8 the numerator; $\frac{8}{20} = \frac{2}{5}$ of the adult dose.

COWLINGS' RULE.—Add one year to the child's age to make the numerator of your fraction. Take 25 as the denominator.

Example.—What is the dose of Basham's mixture for a child of five years? The child's age is five years, then, 5 plus 1 equals 6, the numerator; 25 is the denominator. The fraction, therefore, is $\frac{6}{25}$ or about $\frac{1}{4}$. The adult dose of Basham's mixture is ʒiv ; $\frac{1}{4}$ of ʒiv is ʒi —the dose for a child of five years.

Children over six months old may be considered one year old by this rule.

To determine the dosage for a child *less than six months old* take the *weight* of the child for the numerator and 200 for the denominator.

Example.—A child weighs 10 pounds; $\frac{10}{200}$ or $\frac{1}{20}$ of the usual adult dose would be required.

NOTE.—*Opium, morphine, and codeine are given in HALF THE DOSAGE required by above rules; cathartics, in relatively larger doses.*

2. **Disease** may cause larger or smaller doses to be given than the average; *i.e.*, large doses of morphine are required for excessive pain.

3. **Personal peculiarities** and habits of life may so modify the action of drugs as to require larger or smaller doses.

4. The **method of administering** modifies the dose markedly. Taking the dose as given by the mouth as normal, we may safely say that the *hypodermatic or intravenous method requires $\frac{1}{3}$ less* and the *rectal method twice as much as the dosage by mouth.*

THE PREPARATION OF FRACTIONAL DOSES FROM TABLETS AND SOLUTIONS

Potent drugs are frequently found to be dispensed in stock solutions. For instance, the official solutions of arsenic contain 1 per cent. arsenic. This means $\frac{1}{100}$ of a grain in every minim. In 1 per cent. solutions in water the minim is approximately one drop. Potent drugs in tablet form are frequently used, especially in hypodermic medication.

FRACTIONAL DOSES IN SOLUTIONS

To estimate the number of minims of a stock solution required to contain a prescribed dose:

1. *Ascertain the amount of medicament in one minim of the solution.*

2. *Divide this fraction into the fraction or figure representing the required dose.*

Example.—How much 1 per cent. solution of arsenate of soda should be given to administer $\frac{1}{20}$ grain?

Answer.—One per cent. solution is $\frac{1}{100}$ grain in each drop or minim. The required dose $\frac{1}{20}$ grain is equivalent to $\frac{5}{100}$ grain; $\frac{5}{100}$ is 5 times $\frac{1}{100}$, so 5 minims should be given.

If this formula produces a fraction of a drop, dilute the solution sufficiently to secure a whole number of drops.

FRACTIONAL DOSES IN TABLETS

Hypodermic tablets and tablet triturates usually contain fractional doses of potent drugs. The nurse is often called upon to reduce the dose contained in one of these tablets. If the dose is to be given by the hypodermic method she must not use too much water as a solvent. The steps to follow are:

1. *Reduce the required dose and the dose in the tablet to a common denominator.*

2. *Make a fraction of which the numerator of the required dose is the numerator and that of the dose in the tablet the denominator.*

3. *Dissolve the tablet in a sufficient number of minims of water, not to exceed 25, choosing a number easily divisible by the numerator of the fraction, and multiply this number of minims by the fraction. The product will be the number of minims containing the required dosage.*

Example.—Having tablets of strychnia sulphate, gr. $\frac{1}{30}$, to give gr. $\frac{1}{150}$.

Answer.— $30 \frac{30}{1}, \frac{150}{5} 30 \times 1 \times 5$ equals 150, the least common denominator.

$\frac{1}{30}$ equals $\frac{5}{150}$; $\frac{1}{150}$ equals $\frac{1}{150}$; $\frac{1}{150}$ is $\frac{1}{5}$ of $\frac{5}{150}$.

Dissolve the tablet gr. $\frac{1}{30}$ in 25 minims of water. Take $\frac{1}{5}$ of this, or 5 minims.

GENERAL RULES OF DOSAGE FOR OFFICIAL PREPARATIONS

Each mil of a *fluidextract* represents one gramme (1 Gm.) of the drug. Each *minim* represents one grain of the dry drug. Therefore they are of 100 per cent. strength.

All *potent or poisonous tinctures* are 10 per cent. in strength or $\frac{1}{10}$ the strength of the fluidextract or dry drug.

Extracts (solid) are usually four times the strength of the fluidextracts.

The *important potent tinctures* are aconite, belladonna, cannabis indica, cantharides, capsicum, digitalis, ferric chloride, gelsemium, hyoscyamus, iodine, lobelia, nux vomica, opium, squills, strophanthus, and veratrum. These are given in doses ranging from 0.5 to 1 mil (℥viii to xv). *Fluidextracts*, corresponding, would be given in $\frac{1}{10}$ this dose, or 0.5 to 0.1 mil (℥i to ii). *Extracts* (solid) of potent drugs usually have $\frac{1}{4}$ this strength and a dosage of 0.015 Gm. or gr. $\frac{1}{4}$.

Most other tinctures, excepting a few seldom-used potent ones, are given in doses of 2 to 4 mils (℥ss to ℥i).

All *syrups* may be given in doses of 2 to 4 mils (℥ss to i) excepting the syrups of iodide of iron, ipecac, squills and squill compound, each of these being given in a dosage of 1 to 2 mils (℥xv to ℥ss).

All *spirits* have a dosage of 1 to 2 mils (℥xv to xxx) excepting spirit of nitroglycerin, the dose of which is 0.06 mil (℥i).

All *mixtures* have a dose of 4 to 8 mls ($\text{̄}3\text{i}$ to $\text{̄}3\text{ii}$).

All *pills* have a dosage of two pills, excepting pill of phosphorus and pill of opium, the dose of each of these being one pill.

QUESTIONS

1. Having a tablet of gr. $\frac{1}{4}$ how would you give gr. $\frac{1}{100}$?
2. How much 2 per cent. solution will contain $\frac{1}{25}$ of a grain?
3. Given a solution gr.v to $\text{̄}3\text{i}$ how could you give gr. $\frac{1}{10}$?
4. Name some of the conditions which modify dosage. What is Young's rule? Give an example of its application. What drugs are **not** subject to this rule?
5. What is the percentage strength of the fluidextracts? of the potent tinctures? of the extracts? Name the important potent tinctures. Give the general rule for the dosage of official syrups, spirits, mixtures, pills, tinctures, fluidextracts and extracts of potent drugs.

CHAPTER III

METHODS OF ADMINISTERING MEDICINES

A MEDICINE applied to only one certain part of the body is said to have a LOCAL action. Others have a GENERAL action.

METHODS BY WHICH MEDICINES ARE MOST FREQUENTLY USED FOR LOCAL ACTION

LOCAL APPLICATIONS

(1) **To the Skin.**—Consist of lotions, baths, ointments, paints, plasters and collodions.

(2) **To the Mucous Membranes.**—(a) *The conjunctiva* is medicated chiefly by “eye drops” used with a medicine dropper or irrigator. In using drops or irrigation the patient throws his head back, the nurse draws the lower eyelid down and instils a drop or two of the medicated solution. In irrigating the eye a special irrigating vessel may be used, using a fine stream of fluid, poured *very* slowly. The fluid should be warm, should be poured without force.

(b) *The nasal membrane* is medicated by instillations, sprays, or irrigation. A medicine dropper is used to instil medicines, an atomizer or nebulizer for spraying. The ordinary douche can or a special irrigator or a syringe may be used for irrigation. The fluid should be warm, should not be used with any force and the patient must be cautioned not to swallow or attempt to talk while the irrigation is going on. The fluid should pass in one nostril and out of the other. The mucous membrane of the nose is very sensitive.

(c) *The mouth and pharynx* are medicated by means of lozenges, or troches, mouth-washes, gargles, or sprays. Medicines are sometimes painted on the pharynx with a camel's hair-brush.

(d) *The larynx* is medicated chiefly by means of inhalations. Either inhalation of medicated air, medicated steam or atomized or nebulized fluids may be employed for local medication of the larynx.

(e) *The stomach and intestines*. See below, "Medication by Mouth."

(f) *The rectum*. See below, "Rectal Medication."

(g) *The vagina* is medicated by suppositories or douches. Direct applications of medicines on gauze or cotton tampons are also made.

METHODS BY WHICH MEDICINES ARE MOST FREQUENTLY GIVEN FOR GENERAL ACTION

1. By mouth.
2. By rectum.
3. By injection under the skin (hypodermic).
4. By inunction into the skin with a fatty base.
5. By injection into a vein (intravenous).
6. By inhalation.

ADMINISTRATION BY MOUTH

This is the most usual method of administering medicines. The medicinal substance, if soluble, is absorbed with the products of digestion in the stomach and intestines and passes into the blood- and lymph-streams, producing certain chemical and physical reactions with the cells of the body, either at that time or later, which result in what we term *drug action*.

When a drug seems to have a marked action on one special group of body cells, as for example the depression

of the nerve cells by narcotic drugs, we speak of the *selective action* of the drug. When drugs are used externally on the skin, or in the cavities of the body, or when they are given by mouth in order to act rather on the mucous membranes of the stomach and intestines than on the body cells after absorption, we speak of their use for *local action*.

TIME AND FREQUENCY OF ADMINISTRATION BY MOUTH

A. FOR LOCAL ACTION

a. On the mouth and throat must be used frequently—every hour or so. No food immediately afterwards.

b. On the Stomach.—To medicate the stomach walls give $\frac{1}{2}$ to 1 hour before meals. To act on stomach contents, give during or after meals.

c. On the Intestine.—Must be given two or three hours after meals.

d. On the Rectum.—After the bowels have been emptied.

B. FOR GENERAL ACTION

To obtain a single, rapid action, give the remedy, if possible, in hot concentrated solution on an empty stomach. Remedies must be given with regard to the time of their action; slow acting cathartics, as pills, at night; rapidly acting ones, as Epsom salt, in the morning.

To obtain a more or less continued action, give the remedy three times a day, after meals.

ADMINISTRATION BY INHALATION

Inhalation of medicated vapors or of gases, in order to saturate the blood through the capillaries of the lung, is little used for general action excepting in the case of the anæsthetics and in the use of pure oxygen. Medication locally of the upper respiratory tract by inhalation of essential oils

and other volatile substances has a limited application in respiratory diseases.

THE HYPODERMIC METHOD

In administration of medicines under the skin, every precaution should be taken to insure perfect cleanliness of the skin, the instrument, and the needle.

1. Scrub the skin well, preferably the outer part of the arm, with soap and water, followed by alcohol, or at least with alcohol alone.

2. Place the needle in a teaspoon filled with water and boil it for two minutes over a flame from a stove or gas jet.

3. Draw the hot water into the barrel of the syringe and return it to the spoon several times, to clean the syringe barrel. Boil the water again for a minute, fill the syringe barrel with it, and hold the latter in one hand while the spoon is emptied of the remaining water, leaving the needle.

4. Screw the needle into the syringe barrel, being careful to hold the former by its base and not to touch the needle proper.

5. Lay the syringe down in such a manner that its point will not be soiled, place a hypodermatic tablet in the spoon, and expel the water in the syringe on the tablet and draw the solution into the syringe.

6. Hold the syringe, *needle up*, and push the piston until the air is expelled from the needle and a well-formed drop appears at the tip. Pinch up a portion of the cleaned skin which does not show any veins, insert the needle with a quick sure movement *under* the fold of skin so raised, and expel the contents slowly, gently massaging the elevation produced.

7. Withdraw the needle and rinse both it and the syringe in water, followed by alcohol.

Medicines frequently given by the hypodermic method

are the salts of atropine, caffeine, strychnine, sparteine, morphine, heroin, codeine, hyoscine, pilocarpine, physostigmine, cocaine, apomorphine, and quinine. Also adrenalin, pituitrin, camphorated oil, extract of ergot, strophanthin, nitroglycerin, ether, and brandy. Normal salt solution and the various vaccines and antitoxins are given in this way, but not in the ordinary small syringe.

INTRAVENOUS INJECTION

In giving intravenous injections unusual care should be taken to secure aseptic technic. While this operation is usually performed by the physician, the nurse may be called upon in an emergency, when familiarity with its technic will be valuable. A vein on the anterior surface of the elbow is usually chosen—the median, median-basilic or median-cephalic. Having carefully prepared the skin, as for a hypodermic injection, a ligature or tourniquet is drawn snugly but not tightly over the biceps, to obstruct venous, but not arterial, flow. The veins then become engorged and stand out prominently. Being sure all air is expelled from the syringe, the point of the needle is inserted into the vein, taking care not to pass through it. The ligature is immediately released by an assistant, and slight suction made in the syringe, which should be of the all-glass type. The quick appearance of blood in the syringe barrel shows that the lumen of the vein is occupied. The injection should then be made *very slowly*, about a minim at a time. The needle should be withdrawn rapidly and a sterile compress placed over the puncture, followed by a bandage.

INTRAMUSCULAR INJECTION

The technic is the same as for hypodermic injection, excepting that the needle is plunged deeply, through the skin

and *into* the muscle. The gluteal muscles are probably most frequently injected, although the pectoral and deltoid muscles are sometimes used for this operation.

INUNCTION

Medicines dissolved or suspended in fatty vehicles are sometimes given by inunction, being absorbed by the intact skin. This method has the disadvantage of uncertainty of dosage, tediousness, and lack of cleanliness. Its chief advantage lies in the free use of medicaments which irritate the digestive tract.

Mercury in the form of ointment and the oleate is the most frequently used medicament employed in this manner for general action. In administering inunctions the skin must have been washed with soap and water and the ointment applied with a gentle friction for at least ten minutes. The fatty base must not be so stiff than good lubrication is not obtainable. The thin skinned portions of the body, as the axilla, groin, abdomen, etc., are preferable spots for inunction. A new spot should be chosen each day so that the same place will not receive medication twice in one week. The ointment should remain on the skin for 24 hours.

MEDICATION BY BATHS, POULTICES, ETC.

The use of baths, poultices, etc., belong more properly to the sphere of general nursing measures, and so will not be included here.

RECTAL MEDICATION AND ENEMATA

The two most used methods of medication by way of the rectum are the use of suppositories and enemata. *Suppositories* are pencil-shaped masses that melt at body temperature, with a fatty or glycerinated base into which the medicines are incorporated.

Three kinds of enemata are given; the *nutritive* and the *medicated*, to be retained and absorbed; the *purgative*, to stimulate the action of the bowels and cause expulsion of the intestinal contents. *Rectal irrigations* are in the nature of enemata, but in this treatment the fluid is allowed to run till a sufficient quantity to wash the bowel has entered, and then it is allowed to return through the same or another tube.

Enemata may be either *high* or *low*. The former can be given through a long soft rubber rectal tube, which passes into the large bowel for six inches or more. The low enema may be given with an ordinary hard rubber tip just reaching into the rectum. As the lower portion of the rectum is very sensitive, low enemata are expelled more rapidly than high ones.

Nutritive Enemata.—Important points in the administration of nutritive enemata are:

1. Let the bowel be cleansed by a purgative enema several times previously—at least once daily.
2. Let the bulk of the enema not exceed six ounces.
3. Let the consistency be less than semi-fluid.
4. Let the temperature be about 100° F.
5. Let the enema be given through a small, soft tube, *very* slowly.

A typical nutritive enema is the following:

Beat up an egg and add it to half a pint of milk. Warm to blood-heat and add the contents of a peptonizing tube (Fairchild's). Set aside in a warm place for an hour. A tablespoonful of brandy or of sugar may be added. Half of this quantity, mixed with 2 ounces of thick gruel or flower paste, should be given by high rectal enema every three hours, having first irrigated the bowel with salt solution.

Purgative Enemata.—A much used enema is the ordinary soapsuds (SS.) enema. It is given hot, about a quart

being used for an adult, and turpentine, $\mathfrak{z}\text{i}$ to $\mathfrak{z}\text{iv}$, is often added.

Glycerin is often added to water or suds as an enema. One-half an ounce of glycerin added to one or two ounces of hot water is used as a purgative enema for infants.

The 1-2-3 enema, a powerful irritating compound, is often used in hospitals. It consists of Epsom salt $\mathfrak{z}\text{i}$, glycerin $\mathfrak{z}\text{ii}$, water $\mathfrak{z}\text{iii}$,—with or without turpentine, one or two teaspoonfuls.

A turpentine enema may be prepared by adding oil of turpentine in the proportion of $\frac{1}{2}$ to 1 ounce to a pint of hot soap-suds, beating it up well, and administering immediately in the usual way. This should be followed by a pint of plain soap-suds enema.

One pint each of molasses and milk with turpentine, a tablespoonful, is credited by some surgeons with special virtue in abdominal distention following operation. A cleaner preparation consists in beating up an egg, adding turpentine 1 teaspoonful, drop by drop, glycerin 3 ounces, and soapsuds to make a pint. In both of these formulas, the object is to emulsify the turpentine in order to get its full effect.

Oil enemata are often used in chronic constipation. Olive or cotton seed oil, warmed, is given high in quantities of from 4 to 6 ounces in the evening, the patient remaining on his face with hips elevated for half an hour afterwards in order to retain the oil.

A starch enema may be prepared by stirring a teaspoonful of starch in a little cold water until smooth, and then adding slowly 6 to 8 ounces of boiling water. Boil for one or two minutes and add hot water if needed to make the mixture of the consistency of cream. Allow enema to cool to 102° F. before giving it. As this mixture is rather viscid it is best

administered by a bulb or piston syringe attached to a rectal tube.

Starch water enemata, 1 to 2 ounces, with opium in proper dosage, are often given to children with diarrhœa and irritable rectum. Strained gruel may be used instead of starch water with good effect.

A turpentine enema is given for its carminative action to relieve meteorism or intestinal distention.

A starch enema is given for its emollient action in irritable or inflamed conditions of the intestinal mucous membrane, or as a vehicle for the rectal administration of drugs.

The Murphy drip, or *proctoclysis*, is the administration of warm salt solution through a permanently retained, soft rectal tube, at a very slow fixed rate of flow (30 to 60 drops a minute) for continuous periods varying in duration from several hours to a day, or longer.

In proctoclysis with an ordinary can the flow may be ascertained by watching the level of the liquid in the can, which should be only slightly raised above the patient's pelvis. An ordinary artery forceps clamped about the outflow tube will stop the flow, while raising or lowering of the can will control the rate of flow. The liquid may be kept warm by tying a couple of hot water bags about the can, and covering it with a small blanket.

CHAPTER IV

THE PREPARATION OF ANTISEPTIC AND OTHER SOLUTIONS

THE nurse is very often called upon to prepare solutions of various chemicals in water for use in medicine and surgery. She may be told: (1) to make a solution of a certain percentage strength; (2) to make a solution of a certain number of parts to 1000 parts, or (3) to make a saturated solution.

SOLUBILITY

Various salts have various rates of solubility in water—thus iodide of potassium will dissolve in less than its own weight of water, while boric acid requires about eighteen times its own weight to make a solution. Heat will make a sparingly soluble salt more soluble, but the excess over the normal amount will fall as a sediment when the solution cools. The addition of more soluble salts to the less soluble will make the latter dissolve more readily,—for instance, mercury, bichloride, soluble one part in fifteen of water, will, on the addition of ammonium chloride, become soluble in proportion of two parts to fifteen of water.

DEFINITIONS AND RULES

A *solution* is a clear, homogeneous liquid, having molecules of a solid, another liquid, or a gas, uniformly diffused through it, so that they are invisible and do not separate on standing.

The liquid which holds the dissolved substance in solution is called the *solvent*.

TABLE OF SOLUBILITY

Name of Chemical	Water 25°C. (77° F.)	Boiling Water	Alcohol 94.9 per cent. 25°C. (77° F.)
(One part is soluble in)			
Acidum Benzoicum.....	281	15	1.8
" Boricum.....	18	3	15.3
" Citricum.....	0.54	0.4	1.55
" Gallicum.....	83-86	3	4.14
" Salicylicum.....	308	14	2
" Tannicum.....	0.34	V.S.	0.23
" Tartaricum.....	0.71	0.5	1.67
Alumen.....	9	0.3	INS.
Ammonii Benzoas.....	10.5	1.2	25
" Bromidum.....	1.2	0.7	12.5
" Carbonas.....	4	DEC.	DEC.
" Chloridum.....	2	1	50
" Iodidum.....	0.6	0.43	9
" Phosphas.....	4	—	INS.
Antimonii et Potassii Tartras.....	15.5	3	INS.
Antipyrinæ.....	1	—	1
Apomorphinæ Hydrochloridum.....	39.5	DEC.	38.2
Argenti Nitras.....	0.54	0.1	24
Arseni Trioxidum.....	100	15	SP.
Atropinæ Sulphas.....	0.38	V.S.	3.7
Caffeina Citrata.....	32	—	22
Calcii Chloridum.....	1.3	V.S.	8
" Hypophosphis.....	6.5	6	INS.
Calx.....	760	1600	INS.
Chloralformamidum.....	18.7	DEC.	1.3
Chloralum Hydratum.....	V.S.	V.S.	V.S.
Cinchonidinæ Sulphas.....	63	—	72
Cinchoninæ Sulphas.....	58	—	10
Cocainæ Hydrochloridum.....	0.4	—	2.6
Codeina.....	88	—	1.6
Codeinæ Phosphas.....	2.25	—	261
Cupri Sulphas.....	2.2	0.5	400
Eucaïnæ Hydrochloridum.....	22	12.5	14
" Lactas.....	4	—	8
Ferri Sulphas.....	0.9	0.3	INS.
Heroin Hydrochloridum.....	2	—	11

Abbreviations: ABT. about; ALM. almost; DEC. decomposed; INS. insoluble;
S. soluble; SP. sparingly; V. very

GLYCERIN dissolves Boric Acid, 1 in 4.6; Phenol, 3.5 in 1; Iodine, 1 in 65
Morphine Acetate, 1 in 5.2; Potassium Iodide, 1 in 2.5.

TABLE OF SOLUBILITY—*Continued.*

Name of Chemical	Water 25°C. (77°F.)	Boiling Water	Alcohol 94.9 per cent. 25°C. (77°F.)
(One part is soluble in)			
Hydrargyri Chloridum Corrosivum....	13	2	3
Iodoformum.....	9391	—	46.7
Iodum.....	5000	—	10
Lithii Benzoas.....	3	2.5	13
“ Carbonas.....	75	140	INS.
“ Citras.....	2	1.5	ALM. INS
“ Salicylas.....	V.S.	V.S.	V.S.
Magnesii Sulphas.....	0.85	0.13	INS.
Morphinæ Acetas.....	2.25	—	21.6
Morphinæ Hydrochloridum.....	17.2	1	42
“ Phosphas.....	6.75	0.5	700
“ Sulphas.....	15.3	0.75	465
“ Tartras.....	11	—	ALM. INS.
Phenol.....	19.6	—	V.S.
Plumbi Acetas.....	2	0.5	30
Potassii Acetas.....	0.4	V.S.	2
“ Bicarbonas.....	3	DEC.	ALM. INS.
“ Bitartras.....	200	16.7	V.SP.
“ Bromidum.....	1.5	1	180
“ Chloras.....	16	1.7	ALM. INS.
“ Iodidum.....	0.7	0.5	12
“ Nitras.....	3.6	0.4	V.SP.
“ Permanganas.....	15	3	DEC.
Quininæ Bihydrochloridum.....	0.75	—	5
“ Bisulphas.....	8.5	—	18
“ Hydrobromidum.....	40	—	0.67
“ Hydrochloridum.....	18	V.S.	0.6
“ Sulphas.....	720	30	86
Saccharin.....	400	24	25
Saccharum.....	0.46	0.2	137.2
“ Lactis.....	4.79	1	INS.
Salicinum.....	21	—	71
Sodii Acetas.....	1	V.S.	23
“ Benzoas.....	1.6	1.3	43
“ Bicarbonas.....	12	DEC.	INS.
“ Boras.....	20.4	0.5	INS.
“ Bromidum.....	1.7	0.8	12.5
“ Chloridum.....	2.8	2.5	ALM. INS.
“ Citras.....	1.1	0.4	SP.
“ Hypophosphis.....	1	0.12	25

TABLE OF SOLUBILITY—*Continued.*

Name of Chemical	Water 25°C. (77° F.)	Boiling Water	Alcohol 94.9 per cent. 25°C. (77° F.)
	(One part is soluble in)		
Sodii Iodidum.....	0.5	0.33	3
" Phosphas.....	5.5	—	INS.
" Salicylas.....	0.8	v.s.	5.5
" Sulphas.....	2.8	0.47	INS.
Strontii Bromidum.....	1	0.4	v.s.
Strychnina.....	6400	2500	110
Strychninæ Hydrochloridum.....	35	—	60
" Nitras.....	42	—	120
" Sulphas.....	31	—	65
Sulphonal (Sulphonmethanum).....	360	15	47
Thymol.....	1100	—	v.s.
Veronal.....	160	—	8.5
Zinci Acetas.....	2.5	1.5	36
" Sulphas.....	0.53	0.2	INS.

The *solutions* most commonly employed in nursing measures are solutions of antiseptic chemicals, liquids or solids.

Solutions are made by: (a) dissolving the substance in the required amount of solvent, or (b) diluting a stock solution of the substance with the required amount of solvent.

A *saturated solution* is a solution in which the solvent has taken up all of the dissolved matter that it can hold. Heat increases the saturation capacity of the solvent; cold diminishes it. When it is said that a substance is *soluble* in a definite number of parts of a solvent, it means that this ratio prevails at a definite *temperature*, usually about 60° F.

When a solvent is heated and an amount of the substance is dissolved in excess of that required to make a saturated solution, the result is a *supersaturated solution*. The excess of dissolved substance is precipitated as soon as the solution cools.

The *strength of solutions* is usually expressed in a *ratio*, as 1 to 1000, 1 to 5000, etc.

Percentage solutions are solutions in which the *ratio* is always a *certain number of parts in 100*—1, 3, or 5 per cent., are 1, 3, or 5 parts in a hundred.

Excepting where this ratio of a certain number of parts to 100 (the percentage method) is employed, the *usual ratio* is 1 to a *definite number of parts of the solvent*, as 1 to 1000, 1 to 6000, 1 to 250, etc.—*the amount of substance to be dissolved always remaining at 1—and the amount of solvent varying with the required dilution.*

The *metric system* of weights and measures is almost invariably employed in the preparation of solutions, because of its decimal arrangement and greater simplicity. But occasionally the *apothecaries' system* is designated. Whichever system is employed, it is important to remember that *the term ratio means that a given weight or a given measure of a substance is to be dissolved in 100, 1000, 5000—or whatever the Ratio may be—times that weight or measure.* You cannot make a 1 to 1000 solution of salt by dissolving an apothecaries' drachm in a metric litre, for a litre is 1000 times a *gramme*, or millilitre of water—you would instead of a *gramme* have to multiply a *drachm* 1000 times to arrive at a proper result.

The first and last terms of the ratio must be the same kind of a unit of weight or measure. A grain to an ounce is not a mathematical ratio at all for the first and last terms are unlike; but a grain to 500 grains, or minims of water, would be a 1 to 500 solution.

PROBLEMS IN THE PREPARATION OF SOLUTIONS

The most usual problems in the preparation of solutions are:

1. To make solutions of a definite ratio from the *original substance* in powder, solution or tablet.
2. To make solutions from *concentrated solutions* of the original substance.
3. To determine the *ratio* of solutions, *knowing the quantities of the ingredients* to be used.

SOLUTIONS FROM THE ORIGINAL SUBSTANCE

A simple and rational method to employ in the preparation of solutions is to begin all problems with an estimation of a 1 to 1000 solution.

One gramme or mil of the substance in 1000 mils always makes a 1 to 1000 solution.

TO MAKE SOLUTIONS OF A RATIO GREATER OR LESS THAN 1 TO 1000

The amount of substance required to make 1000 mils, or 1 L. of a higher or lower dilution will be represented by a fraction of which 1000 is the numerator and the required dilution the denominator. For instance, if a litre of 1 to 5000 solution is desired it will take $\frac{1000}{5000}$ or $\frac{1}{5}$ of 1.0 Gm. or 0.20 Gm.

If a solution of 1 to 250 is desired, it will require $\frac{1000}{250}$ or 4 times the amount required for a 1 to 1000 solution, or 4 Gm. or mils.

Multiply or divide this result proportionally to obtain the amount of substance required to make more or less than one litre of solution.

Example.—How much carbolic acid is used to make 3 litres of a 1 per cent. solution?

Answer.—One per cent, is 1 part to 100, or 10 parts to 1000. To make a litre, or 1000 mils, or 10 times 100 mils,

we must take 10×1 , or 10 mls, of carbolic acid. To make 3 litres, which is 3 times 1 litre, we must take 3 times 10 mls, or 30 mls of carbolic acid.

SOLUTIONS BY DILUTION

To estimate the amount of a concentrated solution needed to make a solution of less concentration:

In doing this use the method just outlined in which the quantity of the substance required to make a given amount of solution of a given strength is estimated. Then multiply this result by the last figure of the ratio of the concentrated solution which you wish to use.

Example.—How would you make 2 litres of 1 to 2000 solution of bichloride of mercury from a 1 to 10 solution?

One Gm. in 1000 mls makes a 1 to 1000 solution. $\frac{1000}{2000}$, or $\frac{1}{2}$, or 0.5 Gm., will be required for 1000 mls of a 1 to 2000 solution.

Two times 0.5 Gm., or 1 Gm., will be required to make 2000 mls, or 2 litres of a 1 to 2000 solution. Since a 1 to 10 solution contains 1 Gm. in 10 mls, then 10 times 1, or 10 mls, will be required.

Example in the Apothecaries' system:

How would you make a pint of 0.1 per cent. solution of carbolic acid from a 5 per cent. solution?

First reduce a pint to its lowest terms—*i.e.*, minims. One pint has 16 times 480, or 7680 minims; 1 per cent., or $\frac{1}{100}$ to $100 = 1$ to 1000.

The amount of carbolic acid necessary to make $\frac{1}{1000}$ of 7680 is represented by $\frac{7680}{1000}$, or 7.68 minims of acid. Since the solution to be used is 5 per cent. strength, or 5 parts to 100, or 1 part to 20, then the amount of solution required will be 20 times 7.68 minims, or 153.6 minims, or $\text{ʒii} \text{m. } 33+$.

SOLUTIONS IN PERCENTAGE RATIOS

Rule.—To find the amount of substance necessary to make a litre of any percentage, or 1 to 100 solution, multiply the per cent. given by 10, simply inserting a cipher, and the result will be the required number of grammes or mils per litre.

Example.—How much boric acid will be required to make a litre of 2 per cent. solution?

Answer.—The percentage required is 2. Applying the rule, we add a cipher, making 20 (10×2). This is the number of Gm. required. 20 to 1000 is 2 to 100, or 2 per cent.

ESTIMATING SOLUTIONS BY MATHEMATICAL PROPORTION

The proportion method furnishes an easy and rapid way to compute quantities required in solution. In stating the proportion be sure your statement is correct.

Example.—To make 2000 mils of a solution 1 to 1000 what quantity of 1 to 20 solution must be used?

We have the proportion:

One to 20 is to 1 to 1000 as the unknown quantity of the 1 to 20 solution is to 1 to 2000. Let x equal this unknown quantity.

Then, $20 : 1000 :: x : 2000$.

Multiplying the extremes and dividing by the means we have: $\frac{20 \times 2000}{1000 x}$ or $\frac{1000 x}{x}$ equals 40,000.
 x equals 40 mils.

When the quantity of drug is given, to make a solution of a given ratio.

Here the quantity of solvent to be added is the unknown quantity. For instance, take the problem:

How much water will be required to make a 1 to 2000 solution from 0.6 Gm. of drug?

It will require 1 Gm. of drug to 1 L., or 1000 mils, to make a 1 to 1000 solution, hence 0.5 Gm. to 1000 mils to make a 1 to 2000 solution.

If 0.5 Gm. makes 1000 mils of this strength, 0.1 Gm. will make $\frac{1}{5}$ of 1000 mils, or 200 mils, and 0.6 Gm. will make 6 times 200, or 1200 mils, or 1 L. 200 mils.

Or by proportion:

The quantity of water is to 0.6 as 2000 is to 1.

$x : 0.6 :: 2000 : 1.$

x equals 0.6×2000 , or 1200 mils.

To convert percentage to its lowest terms of ratio, divide 100 by the percentage.

Example.—One per cent. is 1 to 100, but 5 per cent. is 5 parts to 100, or $\frac{100}{5}$ 1 part to 20.

To estimate the percentage which is equivalent to a given ratio, multiply the first term by 100 and divide by the second term.

Example.—One to 500 is 0.2 per cent.

One $\times$ 100 equals 100. $\frac{100}{500}$ equals $\frac{1}{5}$, or $\frac{2}{10}$, or 0.2 per cent.

RECAPITULATION

1. To make solutions from the original substance in powder, tablet or solution, it is well to use the Metric system and use as a starting point the 1 to 1000 ratio, or 1 gramme or mil to the litre, or 1000 mils. Then make a fraction of which the numerator is 1000 and the denominator the second term of the ratio. This will represent the fraction of a gramme or mil required to make 1000 mils.

Increase or decrease this quantity proportionately to the amount, greater or lesser, than 1000 mils required.

2. When concentrated solutions are used instead of orig-

inal substances, multiply the net result obtained above by the last term of the ratio of the concentrated solution.

3. To estimate the number of grammes or mils of the original substance to be used in making a litre of any given percentage strength, simply add a cipher to the figure indicating the required percentage.

4. To estimate the amount of solvent to be added to a given amount of original substance to make a ratio of a certain strength, multiply the given amount of original substance by the last term of the desired ratio.

5. Any of the foregoing problems may be solved also by the method of mathematical proportion, letting x represent the unknown quantity.

EXAMPLES IN PROPORTION

(1) How much borax will be required to make a litre of a 1 to 5000 solution?

The amount required is to the desired amount of solution as 1 is to the last term of the desired ratio.

$x : 1000 :: 1 : 5000$. 5000 x equals 1000. x equals 0.2 Gm.

(2) How much borax solution 1 to 20 would be required in the foregoing formula?

The ratio of the stock solution is to the desired ratio as the unknown quantity is to the required total.

$20 : 5000 :: x : 1000$.

5000 x equals 20,000, x equals $\frac{20}{5}$ or 4 mils.

(3) How much water must be added to 5 Gm. of sodium chloride to make a 1 to 1000 solution?

The amount of original substance is to the unknown amount of solvent as the first term of the desired ratio is to the last term.

$5 : x :: 1 : 1000$. x equals 5000 mils.

(4) What strength solution would 7.3 gr. bichloride of mercury tablets make in 4 quarts of water?

One tablet of 7.3 gr. dissolved in a pint of water, which contains something less than 8000 grains (the weight of a given volume being dependent on the temperature of the water), would give a solution of about 1 to 1000; dissolved in 4 quarts, or 8 pints of water, the dilution would be about 8×1000 or 8000.

(5) How many grains of salt will be required to make one quart of normal salt solution?

Normal, or physiological, salt solution contains from 0.6 to 0.9 per cent. sodium chloride. As a pint may be conveniently supposed to contain 8000 minims or grains, and as 0.8 per cent. means 8 grains in 1000 minims, we will have the ratio $8 : 1000 :: x : 8000$.

$$1000 x = 64,000. \quad x = 64 \text{ grains to a pint.}$$

$$2 \times 64 \text{ or } 128 \text{ grains to a quart.}$$

(6) 1 in 20 = ? per cent.?

As per cent. means "in 100," 1 is to 20 as the unknown percentage is to 100.

$$1 : 20 :: x : 100. \quad 20 x = 100. \quad x = 5 \text{ per cent.}$$

(7) 1 in 1 = ? per cent.?

$$1 : 1 :: x : 100. \quad 1 x = 100. \quad x = 100 \text{ per cent.}$$

(8) 1 in 100 = ? per cent.?

$$1 : 100 :: x : 100. \quad 100 x = 100. \quad x = 1 \text{ per cent.}$$

(9) 1 in 8000 = ? per cent.?

$$1 : 8000 :: x : 100. \quad 8000 x = 100. \quad x = \frac{100}{8000} \text{ or } 1/80 \text{ per cent.}$$

(10) 1 in 10,000 = ? per cent.?

$$1 : 10,000 :: x : 100. \quad 10,000 x = \frac{100}{10000} \quad x = \frac{1}{100} \text{ per cent.}$$

(11) The pure drug in bulk is what per cent.?

The undissolved drug is 100 per cent. strength.

APPROXIMATIONS IN THE APOTHECARIES' SYSTEM

In the *Apothecaries'* system, 1 teaspoonful to a quart makes about 1 to 250; to 2 quarts, 1 to 500. One grain to the ounce makes a solution of 1 to 480, roughly 1 to 500. Five grains to the ounce may be considered approximately a 1 per cent. solution.

Remedies frequently employed in solution strengths of 1 to 1000 and over are: Bichloride of mercury, permanganate of potash, argyrol, nitrate of silver, iodine, and formaldehyde.

The drugs usually employed in percentage strengths are carbolic acid, lysol, formaldehyde, argyrol, nitrate of silver, cocaine hydrochloride, sodium chloride (salt), and boric acid.

TABLE OF PERCENTAGE SOLUTIONS

Quantity of Medicament Required for Making—

Percentage	1 fluidrachm	1 fluidounce	1 pint U.S.A.	Parts
1	gr. 0.571	gr. 4.564	gr. 73.02	1 in 100
2	gr. 1.141	gr. 9.128	gr. 146.05	1 in 50
3	gr. 1.712	gr. 13.692	gr. 219.07	1 in 33.33
4	gr. 2.282	gr. 18.256	gr. 292.10	1 in 25
5	gr. 2.853	gr. 22.820	gr. 365.12	1 in 20
6	gr. 3.423	gr. 27.384	gr. 438.14	1 in 16.66
7	gr. 3.994	gr. 31.948	gr. 511.17	1 in 14.28
8	gr. 4.564	gr. 36.512	gr. 584.19	1 in 12.5
9	gr. 5.135	gr. 41.076	gr. 657.22	1 in 11.11
10	gr. 5.705	gr. 45.640	gr. 730.24	1 in 10

The table is arranged on the basis of 73.02 grains of solid in one pint (approx. one grain in 105 minims) of solvent to form a 1 per cent. solution. Dissolve the substance in three-quarters of the total quantity of solvent. Adjust volume to prescribed amount.

CHAPTER V

HOW MEDICINES ACT

IN order to understand the action of drugs, it is needful to remember much of the physiology of the body and of its organs. Disease is a departure from the normal, and the aim of the physician in giving a medicine is to change an abnormal function into a normal one. So we must understand the normal action of our organs and tissues in order to appreciate the effect of medicines in disease. Why do our hearts beat, our arteries throb, our nerves carry sensation, our kidneys secrete urine? One must know the why and wherefore of these functions in order to understand the manner in which drugs alter them.

A *symptom* is an abnormal manifestation of some function or other. Symptomatic treatment is the giving of a drug which will produce an effect just opposite to the effect produced by the disease.

THE NERVOUS SYSTEM

Many drugs act on the nervous system, and modify function through this action. It will be remembered that the *central* nervous system consists of the *brain* and *spinal cord*, with the cranial and spinal nerves. The *sympathetic* nervous system consists of a number of ganglia. All through the nervous system we find *nerve-cells*, little cells which originate nerve impulses. Attached to these cells are little fibres which conduct these impulses always away from the cell. Cells which impulse *away* from the brain and cord are largely *motor* nerves governing motion; cells which

carry sensation *to* the brain and cord are largely *sensory* nerves carrying sensation. A nerve-cell with its fibres is called a *neuron*.

There are some cells in the brain called psychic cells, which seem to have something to do with mental activity.

All nerve-cells may have their functions increased or diminished by the action of drugs. The drugs may act on the cells themselves, or on the nerve-fibres, or on the terminations of the nerve-fibres. A drug stimulating or depressing any one of these parts of a *neuron* would have a corresponding action on the function of the nerve.

In the central nervous system, and especially in that lower part of the brain called the *medulla*, are several collections of nerve-cells which are the starting point of some nerves with very important functions. Here we find the "centres" for the *pneumogastric nerve*, the *vasomotor centre*, which regulates the calibre of arteries, the *centre for respiration*, and the *centre for vomiting*, and other important centres, especially those of the special senses.

The *pneumogastric nerve* sends fibres to the larynx, lungs, heart, stomach, and intestine.

The *vasomotor centre* sends out vasoconstrictor and vasodilator fibres, the former when stimulated tightening, the latter relaxing, the arterial calibre. The constrictor fibres predominate, and their stimulation causes a rise of blood-pressure.

THE SPINAL CORD

The cord is able to perform many automatic functions of the body without the intervention of the thinking brain. These acts are termed *reflex*. A *reflex*, therefore, is an involuntary action excited by a stimulus conveyed by an afferent nerve to a nerve-centre and transmitted to the periphery by an efferent nerve. When drugs stimulate the cells of the

spinal cord, these *reflexes* are increased. A very great increase of these reflexes causes *convulsions*.

THE HEART AND CIRCULATION

THE HEART

The regular beat of the heart is dependent upon at least three factors; first, the ability of heart muscle to contract when stimulated; second, the influence of the pneumogastric nerve in slowing this beat; third, the probable influence of the sympathetic nerve in quickening this beat.

A drug would *slow* the heart by, (1) depressing either the heart muscle—impairing its irritability or conductivity—or by depressing the sympathetic nerves, (2) by stimulating the pneumogastric centre, or (3) by increasing the resistance in the arteries. A drug would *quicken* the heart by (1) stimulating the heart muscle or sympathetic, (2) paralyzing the pneumogastric, especially its terminations, or (3) *decreasing* the resistance in the arteries.

THE PULSE AND ARTERIES

All the arteries and veins contain muscle which is supplied with vasomotor nerves. These nerves originate in the vasomotor centre. The calibre of the arteries may be lessened or increased by the action of a drug on this centre. Stimulation of the vasoconstrictor centre will *decrease* the calibre of the vessels, and depression will *increase* it. The drug may also act *directly* on the muscle of the vessel and produce the same effect. A pulse of high tension is usually slow in rate; a pulse of low tension is usually fast in rate.

THE BLOOD

The blood is composed of formed and liquid elements which may be altered by disease. The formed elements are the red and white blood-cells. The liquid element is the

plasma. The red cells contain a substance called hæmoglobin which carries oxygen to the tissues of the body constituting our "internal respiration." Alterations in the number of these cells, or in the quantity of hæmoglobin in each one, or chemical substances changing the hæmoglobin, cause disease. Certain drugs are used to stimulate the formation of, and the hæmoglobin content of, these red cells.

The white cells may also be increased or diminished in number and activity by the administration of drugs. An increase over the normal of these white cells is called a *leucocytosis*; a decrease is termed a *leucopenia*.

The plasma may vary in its chemical reaction, due to changes in the amounts of carbonates and bicarbonates and carbon dioxide in solution—even up to the point of causing an absolute or relative acidosis.

RESPIRATION

Respiration is an automatic process only partly under the control of the will. In the medulla is the *respiratory centre* which is very sensitive to various stimuli, nearly all of the sensory nerves being able to influence it.

A proper amount of carbon-dioxide gas in the blood has probably the greatest influence in keeping this centre active. Certain drugs stimulating this group of nerve-cells make the respirations deeper, more rapid, and more effective; other drugs depressing it render respiration shallow and slow. Coughing, sneezing, etc., are all reflex acts originating in this centre, and depending on irritability of the centre.

DIGESTION AND ABSORPTION

The hydrochloric acid and pepsin in the stomach, the bile and pancreatic juice in the small intestine are necessary

for digestion. Deficiency of any of these elements may be remedied by proper drugs. The absorption of water in the alimentary tract takes place largely in the last third of the large intestine.

Medicinal substances are *absorbed* in the stomach and intestines, passing by diffusion, osmosis, and selective cell action, into the lymph- and blood-vessels, there affecting the body cells through their individual chemical and physical properties.

PERISTALSIS

Peristalsis is the worm-like movement of the digestive tube by which the liquid food is slowly pushed along and churned until it reaches the last part of the large intestine. Here it becomes more or less solid because of the absorption of its water. This *peristalsis* is due to the action of muscle in the walls of the alimentary tract, and this muscle is supplied with sympathetic nerves. Certain drugs may stimulate or diminish peristalsis by their corresponding action on these "*plexuses*" of nerves. Thus most irritant cathartics act partly through stimulation of these nerve plexuses.

HEAT

The heat of the body is produced through the activity of its organs and tissues, especially the muscles. The distribution and regulation of this heat is controlled by the blood-vessels and the sweat-glands. It is believed that at the base of the brain is a so-called "*heat centre*" which automatically regulates the production and distribution of heat, so that the body remains at a constant temperature. Drugs increasing perspiration or acting on this centre may influence the body temperature.

GLANDS

The activity of the glands is dependent upon their blood supply, and also upon the action of certain secretory nerves which seem to stimulate the little gland cells to action. Drugs acting on these nerves, especially their terminations, may increase or decrease the function of the glands, according as they stimulate or depress these nerves.

PAIN

Pain is due to an irritation of the end of a sensory nerve. Pain impulses are conveyed through the gray matter of the spinal cord. So drugs may cause cessation of pain by depressing the *ends of the nerves*, by depressing the *cells in the gray matter of the spinal cord*, or by depressing the *termination of the cells in the brain*. Sleep is induced by using drugs which diminish or abolish the activity of sensory *nerve-cells in the brain*. The sense centres are rendered less irritable, and sleep follows.

QUESTIONS

1. What is the central nervous system? the sympathetic nervous system? What is a neuron? How may drugs act on the neurons?
2. What are the important nerve-centres in the medulla? Describe their function.
3. What is the vasomotor centre and how does it act? What is a reflex?
4. In what different ways could a drug slow the heart or quicken the heart? How may drugs affect the pulse?
5. In what way may drugs act on the blood? How may respiration be affected by drugs? Describe how these drugs may act.
6. What is peristalsis and how may drugs affect it?
7. How may drugs affect the body heat? Describe the process in detail.
8. How may pain be abolished by drugs? Describe the mode of action of these drugs.

PART II

DRUGS AND MEDICINES—CONSIDERED
UNDER THERAPEUTIC GROUPINGS—
READY REFERENCE TABLES OF INFOR-
MATION CONCERNING SPECIAL DIS-
INFECTION.

CHAPTER VI

DRUGS AND MEDICINES

CLASSIFICATION

Drugs and medicines may be *classified* either according to their *origin* and *chemical or physical properties*, or according to their *action in disease*. For the sake of clearness and brevity, and to facilitate condensation and memorization, the latter method will be followed in the pages following.

CHIEF USES OF DRUGS AND MEDICINES

The three most important purposes for which drugs and medicines are given in disease are: (1) to avert collapse or death; (2) to eradicate, if possible, the cause of the disease; (3) to relieve pain or other symptoms of disease.

Most drugs and remedies belong to the first and third classes. Very few drugs, of themselves, can eradicate the *cause* of a disease. Remedies that act as curative agents on the *cause* of the disease are said to be **SPECIFIC** remedies. Example, quinine cures malaria by killing the malaria parasite in the blood. Remedies that simply *modify* symptoms, and most drugs are of this class, are called **SYMPTOMATIC** remedies. Example, morphia causes insensibility to pain, but does not cure the cause of the pain.

The *physiological action* of a remedy is the condition its administration in non-poisonous doses will bring about in a normal organism.

The *therapeutic action* of a remedy is its action in antagonizing the symptoms of disease.

When two remedies produce opposite physiological effects they are said to have an *antagonistic action*; when they have the same action they are said to be *synergistic*.

Toxic action is the action of a drug in such dosage that symptoms of poisoning are produced.

Cumulative action is the toxic action produced by too rapid absorption or too slow excretion of a remedy after it has been given for some time.

Idiosyncrasy is an unusual or exaggerated effect from a drug not produced by the same dose of the drug in the average individual, the term being used to indicate the *susceptibility* of the individual to this reaction and not the reaction itself.

The *therapeutic limit* is the borderland in dosage and medication between toxic and therapeutic effects of a remedy. It is usually indicated by mild toxic symptoms.

Untoward effect is a term used to describe any unfavorable action of a drug produced by idiosyncrasy, cumulative action, arrival at the therapeutic limit, or any other cause.

THE SOURCES OF MEDICINES

Any substance *not* of animal or vegetable origin is said to be inorganic. In medicine, many inorganic substances are used, and among them we frequently hear of *acids*, *bases*, *salts*, and *metals*. We must remember that salts are formed by the union of metals, or compounds of metals called bases, with either acids or certain elemental substances, such as iodine, bromine, etc. When an acid forms a salt the name of that salt ends in *ate* or *ite*, as when sulphuric acid unites with iron, it makes iron sulphate, or sulphite, as the case may be. But when an elemental substance, not an acid, unites with a metal to form a salt, the name of the salt ends in

ide, as when the metal potassium unites with iodine to form potassium iodide. *Ide* then means "nothing else"—potassium, and nothing else.

For example, certain metallic elements known as sodium, potassium, lithium, and strontium, and a base known as ammonium, form compounds with iodine and bromine which are called iodides and bromides. The iodine and bromine are the predominating elements, from a therapeutic standpoint, in all of these salts. But in other compounds of these alkali metals, such as the hydroxide, the *base* is so alkaline as to be the predominating element.

Besides substances from the mineral kingdom, medicine draws supplies from both the animal and vegetable kingdoms. Vegetable drugs have been used from earliest times, but modern pharmacy has enabled us to extract and isolate from these organic materials the principles which are active in a medicinal way.

ACTIVE PRINCIPLES

The *active principles* of most medicinal plants are either alkaloids, glucosides, fixed oils, volatile oils, acids or resinous or balsamic substances. Very many plants contain in addition tannin compounds.

Alkaloids are organic substances containing nitrogen which have alkaline properties, and unite, like ammonia, with acids to form salts. While alkaloids are not usually soluble in water, their salts are. Familiar examples of alkaloids are morphine, obtained from opium, and strychnine, from *nux vomica*.

Glucosides are neutral organic substances, which when boiled with a mineral acid form grape-sugar (glucose) and water instead of salts. Aloin, from aloes, and digitalin, from *digitalis*, are glucosides.

Fixed oils are heavy oils which do not evaporate and which saponify readily forming fat soaps and glycerine. Castor oil and olive oil are examples.

Volatile oils are light-bodied oils which do not saponify, but evaporate readily, and have a marked odor. Oil of peppermint and oil of turpentine are examples.

Acids, such as citric, tartaric, malic and oxalic, are found in many plants and fruits.

Resins are alcohol-soluble exudations of trees and plants, solid in consistency. Mixtures of oils with resins are called *oleoresins*; when certain odorous principles and cinnamic and benzoic acid are also present the product is called a *balsam*.

Animal products used in medicine include the dried glands, or their extracted active principles, obtained from certain domestic animals. Examples are dried thyroid, epinephrin, pepsin, pancreatin, etc.

So-called *biological products*, the result of interaction of animal hosts and bacterial toxins, are seen in the curative sera and antitoxins obtained from the blood of immunized animals. And in the borderland between the animal and plant kingdoms are the vaccine and rabies virus as well as the bacterial vaccines—suspensions of killed bacteria.

THERAPEUTIC GROUPINGS

When it was believed that remedies could be found to act specifically on any disease and on any set of symptoms, a great many terms grew up in medical lore to describe these effects. While many of our ideas have changed, most of these terms still remain, though their appropriateness has suffered with our increased knowledge of drug actions. Very few drugs have only one action—most drugs act differently under various conditions, especially as regards dosage. In

the classification of drugs it is necessary to include the same drug under more than one therapeutic heading. But before doing that it will be necessary to consider a number of therapeutic definitions.

THERAPEUTIC DEFINITIONS

- Alteratives:** Drugs which, when taken internally, produce a healthy reaction in abnormal tissues.
- Analgesics:** Drugs which diminish pain.
- Anaphrodisiacs:** Drugs depressing the sexual centres.
- Anæsthetics:** Drugs abolishing sensation.
- Anodynes:** See Analgesics.
- Antacids:** Drugs diminishing acidity of stomach contents.
- Anthelmintics:** Drugs which kill intestinal worms.
- Anti-emetics:** Drugs preventing vomiting.
- Antigalactogogues:** Drugs decreasing milk secretion.
- Antihydrotics:** Drugs diminishing the excretion of sweat.
- Antiperiodics:** Drugs used in malaria.
- Antiphlogistics:** Applications which reduce inflammation.
- Antipyretics:** Remedies that reduce fever.
- Antirheumatics:** Remedies to combat rheumatism.
- Antisialagogues:** Drugs decreasing salivary secretion.
- Antispasmodics:** Drugs depressing the spinal cord.
- Antiseptics:** Drugs which prevent contagion or sepsis.
- Astringents:** Drugs which cause tissues to contract.
- Cardiac Sedatives:** Drugs which diminish the work done by the heart.
- Carminatives:** Drugs causing a feeling of warmth in the stomach and causing flatus to be expelled.
- Cathartics:** Drugs which cause a vigorous and copious bowel evacuation.
- Caustics:** See Escharotics.
- Cerebral Stimulants:** Drugs which stimulate the higher brain centres.
- Counterirritants:** Drugs which redden or blister the skin when applied locally.

Demulcents: Drugs which have a sedative action on the mucous membrane of the alimentary tract.

Deodorants: Drugs which remove or obscure offensive odors.

Depilatories: Drugs which remove hair.

Diaphoretics: See Sudorifics.

Digestives: Drugs which aid digestion.

Disinfectants: Drugs which prevent infection by destroying germs.

Diuretics: Drugs which increase the urinary flow.

Ecbolics: See Oxytocics.

Emetics: Drugs which produce vomiting.

Emmenagogues: Drugs inducing or increasing menstrual flow.

Escharotics: Drugs destroying tissue by local application. Caustics.

Expectorants: Drugs increasing bronchial secretion.

Galactogogues: Drugs increasing the secretion of milk.

Germicides: See Disinfectants.

Hæmatinics: Drugs increasing the hæmoglobin of the blood.

Hæmostatics: Drugs controlling hemorrhage.

Laxatives: Drugs producing a mild cathartic action.

Mydriatics: Drugs producing dilatation of the pupil of the eye.

Myotics: Drugs producing contraction of the pupil of the eye.

Narcotics: Drugs causing extreme depression of the activity of the brain shown by stupor.

Nervines: Drugs having a beneficial action on nerve function.

Nutrients: Foods.

Oxytocics: Drugs inducing uterine contractions.

Parasiticides: Drugs killing animal parasites.

Purgatives: See Cathartics.

Refrigerants: Saline drugs usually used to combat fever.

Respiratory Depressants: Drugs depressing the respiratory centre in the medulla.

Rubefacients: Mild counterirritants, intended to be applied with friction.

Somnifacients: Drugs which produce sleep.

Stomachics: Drugs intended to improve the tone of the stomach.

Styptics: Drugs locally applied to control hemorrhage.

Sudorifics: Drugs inducing perspiration.

Tænifuges: See Anthelmintics.

Tonics: Drugs increasing the functional activity of the body or any of its organs.

Vascular Tonics or Sedatives: See Cardiac Sedatives.

Vasoconstrictors: Drugs causing a constriction of the blood-vessels of the body.

Vasodilators: Drugs causing a dilatation of the blood-vessels of the body.

Vesicants: See Counterirritants.

DRUGS AND MEDICINES CONSIDERED UNDER THERAPEUTIC GROUPINGS

- I. Drugs Which Affect Secretion.
- II. Drugs Acting on the Nervous System.
- III. Drugs Which Affect the Circulation.
- IV. Drugs Which Affect the Alimentary Function.
- V. Alteratives and Drugs Modifying Metabolism.
- VI. Drugs Which Destroy the Causes of Disease.

I. DRUGS WHICH AFFECT SECRETION

- | | |
|---|--|
| <p>A. Drugs which increase secretion:</p> <ul style="list-style-type: none"> Diuretics: Saline diuretics. Water. Stimulating diuretics. Diaphoretics: Pilocarpine. Expectorants: Nauseating expectorants. | <p>Stimulating expectorants.</p> <p>B. Drugs which diminish secretion:</p> <ul style="list-style-type: none"> The Belladonna Group: Belladonna. Hyoscyamus. The astringents: Vegetable astringents. Mineral astringents. |
|---|--|

A. DRUGS WHICH INCREASE SECRETION

DIURETICS

Diuretics are used: (1) to maintain the action of the kidneys, (2) to evacuate the fluid from the tissues, and (3) to eliminate poisons from the blood.

The secretion of the kidney may be stimulated by drugs which (1) increase the volume of the blood, as the *saline diuretics*, by reason of their salt action; (2) or stimulate the secreting epithelium of the kidney as the *stimulating diuretics*; (3) or increase the blood-pressure in the kidney. This last group really belongs to the cardiac and vasomotor stimulant groups.

A very important diuretic which does not fit into this grouping is water.

SALINE DIURETICS

The following are some of the best known and most used of the saline diuretics:

Potassium Acetate (Potassii Acetatis) 15 to 30 grains (1-2 Gm.)

Potassium Bitartrate, Cream of Tartar (Potassii Bitartras),
15 to 45 grains (1-3 Gm.)

Potassium Citrate (Potassii Citras) 15 to 45 grains (1-3 Gm.)

WATER

Water helps to eliminate waste products, and will stimulate excretion of both perspiration and urine, but should not be used as a diuretic when the patient is dropsical.

ADMINISTRATION.—Water may be given by mouth, by rectum, subcutaneously or intravenously. A common practice is to give water as normal salt solution, intravenously, under the skin or by rectum. Proctoclysis, or the Murphy drip, has been described (page 26). A teaspoonful of salt to a pint of water approximates the strength appropriate for

rectal injection. In surgical shock, hemorrhage, sepsis, intoxications from poisons either manufactured in the body or absorbed, salt solution is indicated. It is not beneficial in primary cardiac failure or dropsy.

STIMULATING DIURETICS

CAFFEINE (CAFFEINA)

This is a basic principle found in tea, coffee, and kola. It is sparingly soluble in water.

PHYSIOLOGICAL ACTION.—Caffeine is a powerful drug which stimulates the functions of the brain, the heart, the lungs, and the kidneys.

On the *nervous system*, caffeine has a remarkable action. While it stimulates the spinal cord in a manner similar to the action of strychnia, it stimulates also the brain—in short, it increases our powers of perception and helps our reception of ideas. On the medulla, it stimulates the vasomotor centre, raising blood-pressure, and, like strychnia, has a tonic action on the respiratory centre.

Muscles respond more quickly, contract more fully, and fatigue less easily after caffeine has been given.

The *heart* beats more forcibly and more rapidly, for caffeine acts on heart muscle as it does on voluntary muscle, increasing its efficiency.

The *pulse* is increased in tension as well as in rate.

The *respiration* is quickened, and strengthened, after caffeine.

The *secretion of urine* is increased by a direct action of the drug on the secreting cells of the kidney, increasing the elimination of waste products. In this, caffeine differs from digitalis, which increases the amount of urine only by increasing the blood-pressure in the kidney.

THEOBROMINE (THEOBROMINA)

This is an alkaloid obtained from the chocolate bean. Its action on the kidney and the circulation resembles that of caffeine, but it does not affect so markedly the brain or the blood-pressure. It is also more irritating to the stomach. A mixture of theobromine with salicylate of soda, known as diuretin, has a wide use.

THERAPEUTIC USES AND ADMINISTRATION.—Caffeine is a useful drug in *poisoning from narcotics*—opium, carbolic acid, and alcohol—on account of its action on the heart and respiration. In *dropsy* and *œdema*, whether from disease of the heart or kidneys, caffeine and theobromine are useful as stimulants to the circulation. In *kidney diseases*, the diuretic action of theobromine and diuretin is superior to that of caffeine.

PREPARATIONS AND DOSAGE.—Caffeine (*Caffeina*), the alkaloid, is not soluble. Its dose is 0.06 to 0.30 Gm. (gr. i–iv).

Citrated caffeine (*Caffeina Citrata*) is a soluble preparation of caffeine, given in a dosage of 0.12 Gm. (gr. ii).

Caffeine-sodium-benzoate (*Caffeina Sodii Benzoas*) has a similar dose but may be given hypodermatically—a valuable point in coma.

Diuretin (*Theobrominæ Sodii Salicylatis*) is given in doses of 1 Gm. (gr. xv) well diluted with water.

COFFEE AND TEA.—Coffee of average strength contains one to two grains of caffeine in every cupful. Tea contains, in its dry state, more caffeine than coffee, but less of the material is used to a cup. On account of the stimulating action of these beverages on the brain, heart, and spinal cord, they are harmful to nervous individuals. Cocoa and chocolate owe their stimulating properties to theobromine. Theo-

retically, they are less harmful than coffee, but this advantage is offset by their tendency to irritate the stomach.

See also Agurin, Theocin, Digitalis, Squill.

DIAPHORETICS

The glands of the skin, like the kidneys, are rendered more active by agents which increase the volume of the blood by salt action, as well as by drugs which directly stimulate these glands themselves. Thus any of the saline diuretics may also act as diaphoretics. Emetics, such as ipecac, by increasing the blood circulation in the skin in the flushing which invariably accompanies nausea, also promote diaphoresis. And in a similar way alcohol, opium, spirit of nitre, aconite and similar substances may act as diaphoretics because they, too, cause a dilatation of the vessels of the skin.

PILOCARPINE

Pilocarpine is an alkaloid derived from the leaflets of of the *Pilocarpus jaborandi*. This drug stimulates the nerves supplying many glands, notably the bronchial, salivary and sweat-glands. Profuse sweating and secretion of mucous and saliva may follow its use even in small dosage. It also contracts the pupil of the eye. It is a dangerous drug, owing to its tendency to produce œdema of the lungs. Seldom should more than $\frac{1}{8}$ grain be given. Atropine is its physiological antagonist.

All the emetic drugs are expectorants and diaphoretics in small doses. The opium preparations, especially the well-known Dover's powder (powder of ipecac and opium), occupy a prominent place in the list of diaphoretics. Diaphoretics are used principally in *diminished kidney secretion* to promote excretion by the skin, and in the *beginning of colds*. Hot packs or baths promote their action.

PREPARATIONS OF PILOCARPINE

- Fluidextract of pilocarpine (Fluidextractum Pilocarpi),
 $\overline{3}$ ss to $\overline{3}$ i (2-4 mils).
 Hydrochloride of pilocarpine (Pilocarpinæ Hydrochloridum),
 $\frac{1}{10}$ to $\frac{1}{4}$ grain (0.005-0.015 Gm.).
 Nitrate of pilocarpine (Pilocarpinæ Nitras),
 $\frac{1}{10}$ to $\frac{1}{4}$ grain (0.005-0.0015 Gm.).

EXPECTORANTS

Two large classes of *expectorants* are met with—those which relax the tone of the blood-vessels supplying the bronchi and those which stimulate the tone of these vessels. The *former* increasing bronchial secretion, are called *sedative* expectorants—and include all those drugs which cause mild nausea, the *nauseating expectorants*—while the *latter* group decrease secretion; the reason for their action is not so well established, though they are named *stimulating* expectorants. The *nauseating* expectorants include many drugs which will be treated under Emetics, such as ipecac, the carbonate and chloride of ammonia (discussed with ammonia), and the iodide of potash (also discussed elsewhere).

The *stimulating expectorants* include turpentine and some of the balsams, as copaiba, some oils, as eucalyptus and creosote.

USES.—*Nauseating expectorants* are given in the first stage of acute bronchitis when secretion is scanty and the cough is “tight.” The stimulating expectorants are useful in the latter stages of acute coughs, or in chronic bronchitis.

UNTOWARD EFFECTS.—The production of nausea and vomiting is not unusual when the *nauseating* type of expectorants is used. Diminished appetite is a frequent result. None of these remedies should be given on an empty stomach, or before meals.

NAUSEATING EXPECTORANTS

See Ipecac (page 186). Tartar Emetic (page 216). Squill (page 212). Iodide of Potash (page 202).

STIMULATING EXPECTORANTS

TURPENTINE

Oil of turpentine (*oleum terebinthinæ*) is distilled from the exudate obtained by wounding various species of pine and fir trees. When turpentine is treated with nitric acid colorless crystals of terpin hydrate are obtained.

Rectified Oil of Turpentine (*Oleum Terebinthinæ Rectificatum*),
Dose, 5 to 15 M. (0.3–1 mil).

Liniment of turpentine (*Linimentum Terebinthinæ*)externally.

Emulsion of turpentine (*Emulsum Olei Terebinthinæ*) . .3i (4 mils).

Terpin hydrate (*Terpini Hydras*)2 to 3 grains (0.15–0.2 Gm.).

USES.—Turpentine is used (1) as a carminative, (2) as a counterirritant, (3) as a diuretic, (4) as an expectorant.

Its carminative action is used in typhoid fever, to promote the expulsion of flatus. As a *counterirritant* it is chiefly employed as a turpentine stupe in *abdominal tympany*, pieces of flannel being wrung out in hot water, sprinkled with turpentine and applied to the abdomen. It is also added to enemata (see *Enemata*, p. 23). Its use as a *diuretic* is limited, as is also its *expectorant* uses. The latter purpose seems better filled by terpin hydrate.

ADMINISTRATION.—Turpentine is best given in emulsion, after food. In large doses it irritates the kidneys and may cause blood to appear in the urine. Terpin hydrate is usually given in an alcohol-glycerin elixir.

SALTS OF AMMONIUM

Ammonia is a gas formed by nitrogen and hydrogen. Water forms a *base* with this gas, which in turn, like the metallic bases (sodium, potassium, iron, etc.), unites with acids or certain elements to form salts. In addition to the *iodide and bromide of ammonium* there is a *chloride* and a *carbonate of ammonium*, both of which have a wide use in medicine, as well as an official *water of ammonium*.

CARBONATE OF AMMONIUM (AMMONII CARBONAS)

This is a pearly-white substance with a strong odor of ammonia. It is commonly known as baker's ammonia or hartshorn, and is soluble in water.

PHYSIOLOGICAL ACTION.—Carbonate of ammonium neutralizes acids. When inhaled, the free gas is very irritating, and through this action on the terminals of the fifth nerve in the nose, it raises blood-pressure and slows the heart, acting reflexly. *When taken into the stomach* in sufficient quantity, it causes some irritation of the pneumogastric nerve and so slows the heart and raises the blood-pressure in the same way. Its use by *hypodermic injection* is therefore of doubtful value. It causes *mild nausea* also, and hence liquefies *bronchial secretion*.

THERAPEUTIC USES.—In *coughs*, carbonate of ammonium acts as a nauseating expectorant and increases the secretion of the bronchial tubes. The *aromatic spirit of ammonia* is a solution of *carbonate of ammonium* in *water of ammonia* and *alcohol*, with certain *aromatic oils* added. This preparation is given in conditions of the stomach where there is *excessive acidity, loss of tone, and flatulence*. It is also used as a *reflex heart stimulant* in sudden fainting spells and in certain diseases. *Water of ammonia* (aqua ammoniæ)

is used to make ammonia liniment (*linimentum ammoniæ*), or "hartshorn liniment," and is seldom given internally.

ADMINISTRATION.—*Carbonate of ammonium* should be given in solution, well diluted, in a dose of 0.3 to 0.5 Gm. (gr. v to viii). The *aromatic spirits of ammonia* (*spiritus ammoniæ aromaticus*) should always be given in iced or cold water, in the dose of 1 to 2 mls (℥xv to xxx).

CHLORIDE OF AMMONIUM

AMMONII CHLORIDUM, SAL AMMONIAC

This salt occurs as an odorless, fine, or granular powder with a cold salty taste. It has few of the reflex effects of the carbonate on the heart, although large doses produce nausea. It has been credited with the property of decreasing bronchial secretion, and is used for that purpose in bronchitis. Some authorities hold that in small doses it increases the bronchial secretion and that in large doses it decreases it. It is used rather extensively and is frequently combined with the *compound licorice mixture* (brown mixture). The average dose is 0.5 Gm. (gr. viii).

B. DRUGS WHICH DIMINISH SECRETION

Two large main classes of drugs diminish secretion, one group, taken internally and acting after absorption through the nervous system, typified by atropine; the other, the *astringents*, being used externally and locally.

THE BELLADONNA GROUP

BELLADONNA (DEADLY NIGHTSHADE)

The leaves of the *Atropa Belladonna* are used internally in medicine. These contain the active principle, an alkaloid, *atropine*.

PHYSIOLOGICAL ACTION.—Belladonna or atropine, in

sufficient doses, causes a stimulation of the *motor area* of the *cerebrum*, resulting in a quick-moving and talking delirium. It has also another distinctive action on nervous tissue—it paralyzes the end-fibres of various nerves, notably those governing secretion, and the pneumogastric nerve, and the third cranial, or motor nerve of the eye. As a result of the paralyzing action on the nerves in glands, salivary, mucous, sweat, and milk glands are rendered less active, the mouth and throat become dry, the skin hot. The third cranial nerve controls the tension of the muscle in the iris of the eye and the muscle which controls accommodation for far or distant vision, and so, after its paralysis by atropine, the pupil is dilated and accommodation is lost—we cannot see nearby objects. The pneumogastric nerve sends branches to the intestinal plexus through the splanchnic nerve. Atropine paralyzing these endings prevents intestinal spasm or “cramps.” Since this pneumogastric nerve is also the nerve which slows the heart, atropine, by paralyzing it, quickens the heart. It also acts on the vasoconstrictor centre in the medulla, raising the blood-pressure and especially constricting the large veins of the abdomen. This brings a compensatory dilatation of the vessels of the skin, causing the flushed face. Like strychnia, it stimulates the respiratory centre in the medulla.

THERAPEUTIC USES.—Atropine and belladonna are used to lessen the excessive secretion of sweat in tuberculosis, and to lessen the milk secretion by a plaster (belladonna plaster) applied to the breast.

When it is deemed necessary to quicken the heart and to determine whether an intermittent pulse is due to nervous influence or to disease of the heart muscle, atropine is useful.

As a respiratory stimulant in opium and other narcotic poisonings, and to paralyze the accommodation and dilate

the pupil in certain eye diseases, it has a frequent use. The antispasmodic effect of atropine on the intestine is taken advantage of in the well-known pill of aloin, strychnia, and belladonna. The local action of atropine or belladonna is very doubtful. Both belladonna and atropine are frequently used in irritable conditions of the bladder—cystitis, incontinence, etc.

PREPARATIONS AND ADMINISTRATIONS.—Atropine sulphate (atropinæ sulphas), 0.0004 Gm. (gr. $\frac{1}{150}$), is best administered by hypodermatic injection. Homatropine, seldom given internally, has the same dose. One per cent. solutions are used in the eye for the purposes above mentioned. Tincture of belladonna leaves (tinctura belladonnæ foliorum) 0.5 mil (℥ viii). Extract of belladonna leaves (extractum belladonnæ) 0.01 Gm. (gr. $\frac{1}{6}$). The ointment (unguentum) and plaster (emplastrum) are frequently-used external remedies.

HYOSCYAMUS (HENBANE)

The dried leaves of the *Hyoscyamus niger*. This drug and its active alkaloid, hyoscine (now called scopolamine) has the same physiological action as atropine, excepting as to its effect on the blood-pressure and on the cerebrum. Hyoscine, unlike atropine, lowers the blood-pressure, sometimes alarmingly, when given in large doses. On the cerebrum, especially when combined with morphine, it has a sedative action. In the so-called "twilight-slumber" technic this drug was used with morphine to bring about loss of memory.

Scopolamine hydrobromide (scopolaminæ hydrobromidum) is given by hypodermic injection in doses of 0.0005 Gm. (gr. $\frac{1}{120}$). Of the preparations of the drug itself, there is the tincture (tinctura hyoscyami) (℥ xv), extract (ex-

tractum hyoscyami) 0.065 Gm. (gr. i), and the fluidextract (fluidextractum hyoscyami) (℥iii).

UNTOWARD EFFECTS.—Scopolamine and atropine may, in susceptible individuals, cause dryness of the throat, flushing of the face, and dilated pupils even in small doses. Sometimes delirium occurs, with rapid pulse. In poisonous doses there is a wild talking delirium, sometimes with collapse. Give hot coffee by rectum and small doses of morphine. The stomach may be washed with potassium permanganate, 1 Gm. to 1000 mls of water, if the poison has been recently swallowed. Cases of absorption from the eye with poisonous symptoms are not rare.

THE ASTRINGENTS

Two groups of *astringents* are used; the (a) *vegetable* astringents, depending for their virtues on some variety of tannin, and the (b) *mineral* astringents.

Among the *vegetable astringents* are tannic acid, derived from nutgalls, gallic acid, galls and gambir, or catechu.

The *mineral astringents* include alum, iron salts, the acetate of lead (sugar of lead), and the solution of acetate of lead (lead-water), the sulphate and the chloride of zinc, and the stearate and oxide of zinc, as well as the sulphate of copper.

Few of these are used internally, although acetate of lead is sometimes employed in diarrhoeas in dosage of 1 to 3 grains (0.06–0.2 Gm.).

The familiar ointment of oxide of zinc and the stearate of zinc have a use in skin diseases.

Lead poisoning, or chronic plumbism, occurs in workers in lead—painters, etc. It is characterized by a blue line about the gums, wrist-drop and abdominal pain. Acute poisoning with the mineral astringents has the symptoms of the irritant poisons—vomiting, pain, and prostration.

ACTION.—The astringents have the power of contracting tissue. Their action is attributed to their ability to coagulate the albumin on the surface of the tissues with which they come in contact. The contraction of this coagulum is supposed to also diminish the calibre of the adjacent blood-vessels, and also to diminish secretion.

THERAPEUTICS.—They are used in subacute or chronic inflammatory conditions, as in the form of gargles in *pharyngitis*, and the use of the lead water in *inflammatory swellings* of the extremities. Internally various astringents are employed for their local action in the intestine in *diarrhæas*, lead acetate, and various tannin compounds as tannalbin, tannigen, etc., being used. In chronic urethritis, vaginitis, etc., astringent douches and injections of alum, zinc sulphate, etc., are employed. (See separate headings, Reference Table.)

NAMES AND DOSAGE OF ASTRINGENTS

Alum (Alumen).....	Dose 8 gr. (0.5 Gm.)
Lead Acetate (Plumbi Acetas), Sugar of Lead,	Dose 1 gr. (0.065 Gm.)
Solution of Acetate of Lead (Liquor Plumbi Subacetatis),	
Goulard's Extract	Externally
Sulphate of Zinc (Zinci Sulphas), White Vitriol,	Dose 15 gr. (1 Gm.) as an emetic
Sulphate of Copper (Cupri Sulphas), Blue Vitriol,	
	Dose ½ gr. astringent, 4 gr. emetic (0.01–0.25 Gm.)
Tannic Acid (Acidum Tannicum) Tannin....	Dose 8 gr. (0.50 Gm.)
Glycerite of Tannic Acid (Glyceritum Acidi Tannici) ..	Externally
Gallic Acid (Acidum Gallicum).....	Dose 15 grains (1 Gm.)
Tincture of Kino (Tinctura Kino).....	Dose ʒi (4 mils)
Tincture of Gambir Compound (Tinctura Gambir Composita),	
	Dose ʒi (4 mils)
Galls (Galla), Nutgall.....	Dose gr. viii (0.5 Gm.)
Tannigen (Tannin Albuminate).....	Dose gr. xxx (2 Gm.)
Tannabalin (Tannyl Acetate).....	Dose gr. v (0.3 Gm.)

Many of the astringents when used in concentrated form, especially on mucous membranes, erode tissues sufficiently to be classed as *caustics*. Most astringents act as *styptics*.

QUESTIONS

1. Name two saline diuretics and give doses.
2. Caffeine stimulates the functions of what organs? How does it affect the nervous system? the muscles? the heart? the pulse? the respiration? the urinary secretion?
3. What is theobromine? How does its action compare with caffeine? What is diuretin?
4. Name three therapeutic uses of caffeine and theobromine. What preparation of caffeine may be used hypodermically? What is its dose? What is the dose of citrated caffeine? of diuretin? Why should the latter be given well diluted? Why are coffee and tea injurious to nervous individuals?
5. For what are diaphoretics used? Name one.
6. What are two main classes of expectorants? Name two with doses.
7. What unusual effects may come from overdosage with expectorants?
8. How does carbonate of ammonia affect the heart, the stomach, the bronchi? What are its therapeutic uses? How is it given? What spirit contains carbonate of ammonia? What is sal ammoniac? What are its therapeutic uses?
9. What is belladonna? What alkaloid does it contain? How does it act on the brain? on the nerves? What result does it bring about in the glands? How does it affect the eye? the intestine? the heart-beat? the blood-pressure? the respiration?
10. What are the therapeutic uses of atropine? Give names and doses of several preparations.
11. What is hyoscyamus? What alkaloid does it contain? How does it resemble and differ from atropine? What is its dose and how is it given? Name two other preparations and give doses.
12. What untoward effect may occur in certain individuals from even small doses of these drugs? What are the symptoms of overdosage or poisoning? What is the treatment of poisoning?
13. Name three astringents. For what purpose are they used? From what is tannic acid obtained?

II. DRUGS ACTING ON THE NERVOUS SYSTEM

- | | |
|-------------------------------------|---|
| A. Cerebral sedatives : | Coal-tar analgesics and antipyretics : |
| Somnifacients and hypnotics | Acetanilid, phenacetin, antipyrin. |
| Chloral hydrate. | |
| Trional. | |
| Alcohol and the anæsthetics : | D. Drugs that stimulate the spinal cord : |
| Alcohol. | Caffeine. |
| Chloroform and ether : | Strychnine. |
| Nitrous oxide. | |
| Analgesics and narcotics : | E. Drugs used to paralyze the termination of sensory nerves : |
| Opium. | Local anæsthetics : |
| B. Drugs that stimulate the brain : | Cocaine, orthoform, etc. |
| Caffeine. | |
| C. Spinal sedatives : | |
| The bromides. | |

A. CEREBRAL SEDATIVES

SOMNIFACIENTS AND HYPNOTICS

CHLORAL HYDRATE (CHLORALUM HYDRATUM)

Chloral occurs in colorless crystals with a peculiar odor and taste. The crystals are very soluble in water.

PHYSIOLOGICAL ACTION.—In large doses, chloral has a very depressing effect on the blood-pressure, making the pulse soft and rapid. It is depressing to the heart and respiratory centre when not used with discretion. In moderate doses it produces a quiet, dreamless sleep. Nausea and depression, however, may follow this peaceful slumber. All of the reflexes are diminished by chloral, and it depresses the motor as well as the sensory part of the brain. Long-continued use may cause degenerative changes in internal organs, and even aside from this, a habit resembling alcoholism may be formed. Other and presumably safer hypnotics are:

TRIONAL (SULPHONETYLMETHANUM) AND SULPHONAL
(SULPHONMETHANUM)

These, as is the case with chloral, may be given in doses of 1 Gm. (gr. xv). Veronal (Diethyl-barbituric acid) and chloretone have a smaller dosage, 0.5 Gm. (gr. viii). Chloral is usually given well diluted in syrup or water; chloretone in capsule or powder; trional, sulphonal, and veronal in hot milk. Hypnotics should always be given an hour or so before the time when sleep is desired. In long-continued use of trional or sulphonal the urine becomes stained red, and lassitude, nausea and vomiting occur, with ataxic gait.

POISONING.—In poisoning by chloral or other hypnotics, wash out the stomach, keep the patient recumbent, give strong hot coffee by rectum, and strychnia sulphate, gr. $\frac{1}{30}$, by hypodermic injection. Veronal is a rather dangerous drug, fatal poisoning occurring from relatively small doses. The bowels should be thoroughly emptied by vigorous catharsis when acute or chronic poisoning occurs with either trional, sulphonal or veronal.

Bromidia, Somnos, etc., are proprietary solutions of chloral, and poisoning by them should be treated as chloral poisoning.

ALCOHOL AND THE ANÆSTHETICS

ALCOHOL

Alcohol is used in medicine in the form of brandy, whiskey, various wines, and the malted liquors such as ale and beer. Whiskey and brandy are about 50 per cent. alcohol, wines 6 to 20 per cent. and the malt liquors 4 to 7 per cent. The so-called fermented malt extracts contain about 5 per cent. alcohol. Alcohol made from grain is used in many official preparations, spirits, elixirs, tinctures, etc., and so is very important in pharmacy.

The dose of alcohol is from 4 to 16 mls (3i to 3iv). Diluted alcohol or brandy may be given hypodermically.

PHYSIOLOGICAL ACTION.—Alcohol affects first the higher centres of the brain, paralyzing, so to speak, the will power. The early signs of intoxication are symptoms of lessened self-control, talkativeness, and an apparent stimulation of the mental energies. But alcohol does not stimulate—it paralyzes the brain. As its effect continues, drunkenness ensues, with staggering gait and partial anæsthesia. Large quantities result in alcoholic coma, which must be treated like opium poisoning or poisoning with other narcotics.

The *circulation* is affected by alcohol insomuch as its use helps the heart indirectly. It dilates some of the peripheral vessels and causes a quickened pulse. But it is not a real heart stimulant in the same sense as digitalis or caffeine.

On the *digestive system*, alcohol, well diluted and in small quantities, increases the stomach secretion and aids the movements of the stomach. In 50 per cent. strength it is an irritant to the gastric mucous membranes.

As a *food* alcohol is burned in the body, producing heat and energy. It is a quickly absorbed food suitable only in extreme cases of exhaustion. It acts in this capacity by sparing body tissues that otherwise might be broken down to furnish heat and energy. Its general effect, however, is to cause the loss of more heat than it generates.

THERAPEUTIC USES.—Alcohol is used as a food and to assist the heart in exhausting fevers, typhoid, pneumonia, etc. In chills and threatened cold, hot whiskey dilates the vessels of the skin and gives a feeling of warmth and comfort. It is a much-used stimulant in shock and collapse from any cause.

Gastric atony is often combated by the use of some light wine with the food, or the digestive elixirs which contain 20 per cent. alcohol are used in the same condition.

The habit of alcoholism is very easily formed by neurasthenic and hysterical individuals. Many patent medicines, such as "Peruna" and the like, owed much of their popularity to the alcohol which they contained.

CHLOROFORM AND ETHER

Both of these anæsthetics are derived from alcohol by a chemical transformation. Internally in small doses they have much the same effect as alcohol on the brain and digestion although their action is far more powerful. Alcohol, too, it will be remembered, produces an anæsthetic condition when taken in excessive doses.

Chloroform (chloroformum) is used internally very often as the spirit of chloroform (spiritus chloroformi), the dose of which is from 1 to 2 mls. (℥xv-xxx). The spirit of ether (spiritus ætheris) and the compound of ether are given in the same dose and for the same conditions.

In *gastric flatulence* and in *certain spasmodic conditions*, such as *asthma*, these preparations are used. They should be given well diluted.

Chloroform liniment (linimentum chloroformi) is popular for its counterirritant properties.

As *anæsthetics*, chloroform and ether are given by inhalation. Chloroform is the more effective of the two, is less irritating to the nose and throat, but collapse of the respiration and heart appears more frequently after its use than after the use of ether. From seven to ten minutes is usually required to produce complete anæsthesia. Both of these drugs may cause profound disturbance of the liver and kid-

ney function following their use. Nausea is more frequent after ether than chloroform, but it is not unknown after the latter. *The urine should always be preserved for examination both before and after the administration of either of these anæsthetics.*

In collapse from ether or chloroform: (1) lower the patient's head and chest; (2) give artificial respiration; (3) give adrenalin, $\mathfrak{m}\text{xx}$, with caffeine sodium benzoate, gr. ii, or strychnine sulphate, gr. $\frac{1}{30}$, by hypodermic injection deep in the buttock.

NITROUS OXIDE (N_2O)

Nitrous oxide gas is now a much employed anæsthetic agent, given in combination with oxygen, either as a preliminary to ether anæsthesia or in combination with local anæsthesia. The relaxation is less than with ether or chloroform and the anæsthesia even less is more irregular.

Nitrous oxide, while more asphyxiating than ether, does not combine chemically with the blood elements, being held only in solution in the plasma—hence is believed to have fewer sequelæ than the other anæsthetic agents. It is, however, less flexible in its application, and its field is therefore limited to selected cases. Recently it has had a vogue for obtunding the pain of childbirth.

ANALGESICS AND NARCOTICS

OPIUM

Opium is the concrete, milky exudate from the seed capsule of the poppy plant—the *Papaver somniferum*. It contains nineteen alkaloids, of which morphine and codeine are the most important. Dried opium contains from nine to twelve per cent. of morphine. Besides these two men-

tioned alkaloids, there are two other modifications of morphine used in medicine, one called heroin, the other apomorphine. They are, so-called, artificial alkaloids.

PHYSIOLOGICAL ACTION.—Small quantities of opium or morphine produce a condition of mental abstraction; large doses result in a drowsy condition from which the patient is easily awakened; but, if still larger doses are given, sleep comes, sleep which is deep, merging into torpor as the poisonous dose is reached.

POISON SYMPTOMS.—A deep, torpid sleep, from which the patient can with difficulty be awakened—perhaps even a comatose condition, in which no effort at rousing the patient succeeds—is characteristic of opium poisoning. The respiration is slow, and may be reduced to three or four a minute; the pulse is full and somewhat slow, and the pupils are very much contracted. The face is usually purplish and congested. As a fatal termination is approached, the respiration becomes slower, then intermittent; the pulse becomes more rapid and more feeble; the face more and more congested, and, finally, respiration ceases.

SPECIAL EFFECTS. *Nervous System.*—Morphine abolishes pain by depressing the areas of the cerebrum which govern sensation and thought. It slightly stimulates the spinal cord at the same time, in a manner similar to strychnia. On the medulla it has the effect of depressing the respiratory centre and the vasoconstrictor centre. It has no local action on sensory nerves.

Circulation.—As an effect of the depressed vasoconstrictor action just mentioned, there is a slight dilatation of the superficial blood-vessels. The drug has little or no direct action on the heart.

Alimentary Canal.—Morphine and opium cause a contraction of the portion of the stomach which is joined to the

intestine. After hypodermic injection, morphine is soon found in the stomach and intestine, passing into these organs through the mucous membrane. A marked action in impairing the secretion and movements of the intestine follows the use of morphine and opium in man.

Codeine and heroin produce less depression of the cerebrum and a greater stimulation of the spinal cord than morphine. Their sedative action, especially in the case of heroin, on the respiratory centre is more marked, while their intestinal action is much less than that of morphine.

THERAPEUTICS.—Nothing can take the place of morphine and opium for the relief of pain. Small doses, frequently repeated, are most desirable, for no drug engenders the habit of its use more quickly than morphine. It should never be used for any length of time in acute conditions, nor at all, if avoidable, in chronic cases, unless a cure is hopeless.

In *insomnia* due to pain, morphine or opium will be effective where chloral or the bromides would fail.

In *coughs*, especially when the secretion is scanty, morphine, opium, and especially codeine and heroin, dull the sensibility of the respiratory centre, so that the impulse to cough is not felt so frequently.

In *diarrhæa*, *peritonitis*, *typhoid hemorrhage*, and similar conditions, opium as well as morphine is used to check the intestinal movements and secretions.

In *colds*, and *fevers*, Dover's powder is used as a diaphoretic.

Opium or its preparations should seldom be used in neurasthenic or hysterical patients. The lessened self-control which characterizes these patients easily makes them slaves to the drug. In a certain number of individuals, opium and morphine produce violent nausea and vomiting.

APOMORPHINE.—Apomorphine is used as an emetic, and

is usually given hypodermically. It generally produces, after an ordinary dose, an effective and energetic emptying of the stomach, with little nausea, within ten minutes. In some cases, however, it has a purely sedative effect, similar to morphine.

TREATMENT OF POISONING.—Keep the patient breathing and awake, if possible. To do this, dash cold water on him or hit him with ice-water towels, if necessary. Give *very strong* coffee by rectum. For the respiratory paralysis, give atropine sulphate, 0.0005 Gm. (gr. $\frac{1}{120}$), by hypodermic injection, and repeat it if needed. Since morphine is excreted in the stomach and often absorbed a second time in the intestine, wash out the stomach at intervals of half an hour with solution of potassium permanganate, 1 to 1000.

If the patient is breathing very slowly, and the face is purplish, give artificial respiration, seventeen movements to the minute. Even if breathing stops, *keep this up for one hour or longer, being assisted by relays of helpers*. Persistence in artificial respiration has saved many a victim of opium poisoning, when other means have failed.

ADMINISTRATION AND DOSAGE.—Opium is given in doses of 0.1 Gm. (gr. iss); powdered opium (opii pulvis), 0.06 Gm. (gr. i); extract of opium (extractum opii), 0.03 Gm. (gr. ss); camphorated tincture of opium (tinctura opii camphorata or paregoric), 12 mils (ʒiii).

All other preparations of opium contain 10 per cent. of the drug. Since the dose of the powdered drug is one grain (0.06 Gm.), these preparations have a dosage of ten grains or ten minims (0.6 Gm. or 0.6 mil). This refers to tincture of opium (tinctura opii, laudanum), deodorized tincture of opium (tinctura opii deodorata), and powder of ipecac and opium (Pulvis Ipecacuanhæ et Opii—Dover's powder).

Alkaloids.—Morphine sulphate and hydrochloride (morphinæ sulphas—morphinæ hydrochloridum) have a dosage of 0.015 Gm. (gr. $\frac{1}{4}$); codeine phosphate and sulphate (codeina phosphas—codeina sulphas), 0.03 Gm. (gr. ss); apomorphine hydrochloride (apomorphinæ hydrochloridum), expectorant, 0.002 Gm. (gr. $\frac{1}{30}$); emetic, 0.006 Gm. (gr. $\frac{1}{10}$). All of these salts may be given by hypodermic injection. Heroin (diacetyl morphine) is given as the soluble hydrochloride in $\frac{1}{16}$ to $\frac{1}{10}$ gr. (0.0035–0.006 Gm.).

B. DRUGS THAT STIMULATE THE BRAIN

CAFFEINE

Caffeine is a remedy that stimulates the psychic area of the brain. It is discussed on page 55. Belladonna and atropine stimulate the motor area of the brain (p. 61).

C. SPINAL SEDATIVES

THE BROMIDES

Bromide of	{	Sodium.	Strontii	{	Bromidi.
		Potassium.	Potassii		
		Ammonium.	Ammonii		
		Lithium.	Lithii		
		Strontium.	Sodii		

All of these are freely soluble in water and have a salty taste.

PHYSIOLOGICAL ACTION.—Large doses produce drowsiness and apathy but not actual stupor. The individual is not able to think, or talk, or move so rapidly as before. The mucous membranes, especially of the throat and pharynx, will be found to have partially lost sensation. The action on the circulation is to slow the pulse. The reflexes (see physiology or definition) are lessened in intensity, and this is evidence that the drug depresses the nerve-centres in the

spinal cord as well as in the brain. Large quantities, especially of the bromide of potassium, will depress the heart.

UNTOWARD EFFECTS.—When any bromide is given for a long time, or in unusually large doses, or even in moderate doses to certain individuals who are unusually sensitive to its action, symptoms of the accumulation of the salt in the body tissues are seen, and this condition is known as *bromism*. *Bromism* is shown usually by a skin eruption, blotches and pustules appearing in considerable numbers. Patients taking bromides should be watched carefully for these eruptions. The skin troubles are due to imperfect elimination of the bromide through the skin, and careful and regular bathing will usually prevent their appearance. *Indigestion* and loss of appetite are also symptoms of the excess of bromide medication. *Loss of memory, apathy, and a fine tremor* of the hands and fingers are sometimes seen, even up to the point of marked unsteadiness of gait.

THERAPEUTIC USES.—Since bromides depress the brain and spinal cord and retard thought, they are used to counteract conditions in which the brain and spinal cord are irritated. as the irritability following *mental shock*, the *delirium of intoxications*, in *insomnia*, and *other irritable conditions of the nervous system*. Their chief use, however, is *antispasmodic*, being used to control *spasms of epilepsy*, of *tetanus*, and of *strychnia poisoning*. In *vomiting due to brain irritation*, they are sometimes useful. Their *hypnotic* use is confined to cases in which the loss of sleep is due to some cause other than pain.

DOSE AND ADMINISTRATION.—All of the bromides may be given in doses of 0.5 to 2 Gm. (gr. viii to xxx). They are usually given in an aromatic elixir. If dispensed in powder or solution in water, milk will frequently disguise their salty taste, if the dose given is not too large.

COAL-TAR ANALGESICS AND ANTIPYRETICS

ACETANILID, PHENACETIN, ANTIPYRIN

The first two are white powders practically insoluble in water. Antipyrin is freely soluble in water.

PHYSIOLOGICAL ACTION. *Antipyretic.*—These drugs when given to an individual with fever cause a prompt fall of temperature by a supposed action on the heat centre of the brain. They do not lower the temperature of a normal individual.

Analgesic.—They retard the passage of painful sensations to the brain by acting on the cells of the spinal cord. Unlike morphine, they do not relieve pain by dulling the sensibility of the brain. Consciousness is not lost with the use of these drugs.

Large doses gravely affect the composition of the blood and depress the heart muscle.

POISONING.—Collapse similar to shock often follows the use of these preparations. It is marked by a remarkable cyanosis or bluing of the skin, shallow respiration, fluttering pulse, and great mental apprehension. The skin is clammy and covered with cold perspiration.

THERAPEUTIC USES.—To reduce very high fever, these drugs are now only occasionally employed. They are best given when a fall in body temperature is expected. They are valuable to relieve purely nerve pains of whatever character,—as neuralgia, headache, etc.,—but they are of little use when the pain is due to acute inflammation. Acetanilid has some use as an antiseptic and styptic. Phenacetin or acetanilid is the principal ingredient of the many widely-sold headache tablets, powders, salts, etc. Their use is dangerous.

PREPARATIONS AND DOSES.—Antipyrin and acetanilid (*Acetanilidum*) may be given in tablet or powder, dose 0.25

Gm. (gr. iv). Phenacetin (Acetphenetidinum) and the Compound Powder of Acetanilid (acetanilid 7, soda bicarbonate 2, caffeine 1) are given in doses of 0.5 Gm. (gr. viii). These preparations are best given in powdered form with sugar, or in pill, tablet, or capsule.

D. DRUGS THAT STIMULATE THE SPINAL CORD

Caffeine (p. 55) and strychnine (p. 86) are active stimulants of the spinal nerve centres and their ability to increase reflex activity has been described.

E. DRUGS USED TO PARALYZE THE TERMINATIONS OF SENSORY NERVES

LOCAL ANÆSTHETICS

COCAINE (COCAINA), ORTHOFORM, ETC.

Cocaine is an alkaloid obtained from coca leaves, the leaves of the *Erythroxylon Coca*, a shrub growing in Bolivia. The hydrochloride is very soluble in water, readily absorbed, and strong solutions when injected, often bring about toxic symptoms. Alpyn, eucaine, novocaine, and many similar drugs are alleged to be less toxic than cocaine. Orthoform is sparingly soluble. It is used most frequently as a dusting powder for painful or itching surfaces, as it gives a prolonged action.

PHYSIOLOGICAL ACTION AND USES.—The local anæsthetics relieve pain and itching by paralyzing the terminal nerves in the tissues. Cocaine hydrochloride (cocainæ hydrochloridum) is frequently combined with adrenalin in solutions varying in strength from 1 per cent. to 0.1 per cent. for infiltration anæsthesia. It is also used in eye, ear, nose, and throat surgery. Five grains of cocaine hydrochloride to an ounce of normal salt solution will make a 1 per cent.

solution of the alkaloid. One-half a grain to an ounce will make 1 to 1000 strength. Five minims of adrenalin will be sufficient to add to these solutions to secure the local action of adrenalin on the blood-vessels and to prevent the absorption of the cocaine.

COCAINE POISONING.—Acute cocaine poisoning is seldom fatal. Quick pulse, increased excitability, and nervousness are the symptoms of cocaine absorption. The hydrochloride is sometimes given internally to allay vomiting, in a dose of 0.03 Gm. (gr. $\frac{1}{2}$).

Cocaine, like morphine, often makes its users the victims of an enslaving habit, and many States have laws to prevent its promiscuous sale.

QUESTIONS

1. What percentage of alcohol does whiskey contain? wines? beer and ales? What is the dose of alcohol? How does alcohol affect the brain? the circulation? Is it a real heart stimulant? How does it affect digestion?

2. What are the therapeutic uses of alcohol? Name and give dose of a preparation of ether; of chloroform. What are these preparations used for? Compare the anæsthetic action of ether and chloroform. Why is it necessary to preserve a sample of urine both before and after anæsthesia? What three things should be done in collapse during anæsthesia?

3. How does chloral occur? How does it affect the heart and respiratory centre in large doses? What is the effect of small doses? How does it affect the reflexes? What is the dose of chloral, trional and sulphonal? of chloretone and veronal? How are these drugs best given?

4. How would you treat poisoning by chloral or other hypnotics? What do Bromidia and Somnos contain?

5. What is opium? What are its two most important alkaloids? What artificial alkaloids are obtained from it? What symptoms do small doses of opium or morphine bring about? What are the symptoms of poisoning on the respiration? the pulse? the pupils and appearance of the face?

6. How do morphine and opium affect the nervous system? the circulation? the alimentary canal? How does the action of codeine and heroin differ from the foregoing?

7. What is the chief use of opium and morphine in therapeutics? Name several conditions in which it is used. What are the dangers of its use in nervous individuals?

8. Describe the action of apomorphine. What advantage does it have in its mode of administration? How would you treat opium or morphine poisoning? Persistence in what measure is important?

9. What is the dose of powdered opium? of camphorated tincture of opium? of tincture of opium? What are the common names of the two foregoing preparations? What is Dover's powder? Give its dose. What is the dose of morphine sulphate? of codeine sulphate? of apomorphine hydrochloride?

10. Name three bromides of the alkali metals. What effect do bromides have on the brain, the throat, the circulation and heart, the reflexes? What is *bromism*? How is it to be avoided? For what therapeutic uses are bromides employed? How are they given and in what doses?

III. DRUGS AFFECTING THE CIRCULATION

- | | |
|--------------------------------------|--------------------------------------|
| A. Heart sedatives and depressants: | Ergot. |
| Aconite. | Suprarenal glands. |
| Veratrum. | Pituitary gland. |
| B. Heart stimulants: | D. Drugs which lower blood-pressure: |
| Digitalis. | The vasodilators: |
| Strophanthus. | Amyl nitrite: |
| Camphor. | Nitroglycerine. |
| C. Drugs which raise blood-pressure: | Sodium nitrite. |
| Nux vomica. | Sweet spirit of nitre. |

A. HEART SEDATIVES AND DEPRESSANTS

ACONITE (ACONITUM-MONKSHOOD)

This is the root of the *Aconitum Napellus*. It owes its therapeutic virtues to an alkaloid, *aconitine*. This is so powerful that the dose is 0.00015 Gm. (gr. $\frac{1}{350}$). The fluidextract of aconite (Fluidextractum Aconiti) is given in

doses of 0.065 mil (℥i), the tincture (*Tinctura Aconiti*) 0.6 mil (℥x).

PHYSIOLOGICAL ACTION.—Aconite first stimulates and later paralyzes the sensory nerves, acting on the end organs and producing local anæsthesia. It stimulates the vasodilator centre, dilating the blood-vessels of the body. On the heart it acts by stimulating the pneumogastric nerve and slowing the pulse. Later, if the dose is large enough, it paralyzes the heart muscle. From its action in reducing fever it is believed to depress that part of the brain which is supposed to regulate the loss of body heat—the heat centre.

THERAPEUTIC USES.—Aconite is used in *neuralgia* to abolish pain in the affected sensory nerves, both through its local and general action. In *fever* accompanied by a strong, rapid, bounding pulse, it is sometimes used to slow the heart, promote perspiration through its vasodilator action, and reduce the temperature by its effect on the heat centre. But it is a powerful drug, and must be used with caution.

POISONING.—Numbness and a tingling of the throat and skin are first noticed. The heart at first beats slowly; later, as the heart muscle becomes paralyzed, weakly and rapidly. In *treatment*, keep the patient on his back, give strong coffee by rectum, promote vomiting or wash the stomach, and give atropine sulphate 0.001 Gm. (gr. $\frac{1}{60}$) by hypodermic injection.

VERATRUM (HELLEBORE)

This drug is the root of the *Veratrum viride*. It contains an alkaloid, *veratrine*. The preparations employed are the *tincture* (*tinctura veratri*), dose 0.5 to 1 mil (℥viii to xv), and the *fluidextract* (*fluidextractum veratri*), 0.1 mil (℥i).

Excepting that it does not dilate the blood-vessels so

markedly, the physiological action of this drug is almost identical with that of aconite. It is used for the same therapeutic purposes, and is frequently employed in the convulsions of child-birth (eclampsia), to lower the tension of the pulse. In poisoning with this drug, vomiting is an early symptom.

B. HEART STIMULANTS

DIGITALIS (FOXGLOVE)

The leaves of the *Digitalis purpurea*. Digitalis contains five glucosides, the most important being *digitalin* and *digitoxin*. Digitalin is insoluble in water, hence it is not well adapted for hypodermatic use. A proprietary solution of digitoxin called *digalen* is given in doses of 1 mil (℥xv) by hypodermic injection. The official preparations are: fluid-extract (fluidextractum digitalis), 0.065 mil (℥i); tincture (tinctura digitalis), 0.5 to 1 mil (℥viii to xv); infusion (infusum digitalis), 16 mls (℥ss).

PHYSIOLOGICAL ACTION.—Digitalis and its preparations, when given in proper doses for a sufficient length of time, stimulate the circulation, and, especially, the heart. This action of digitalis is threefold:

1. It *slows the heart* by increasing the length of the diastole or resting period of the organ.

2. It *increases the strength of the contraction* of both the auricles and ventricles, and this increased pumping force increases the output of blood.

3. It *raises the pressure in the arteries* by a direct action on the muscular coats of these vessels, and probably, also, by stimulating the vasoconstrictor centre in the medulla, and, finally, by keeping the vessels more completely filled with blood.

The slowing of the heart, due to an increased diastole or resting period, is brought about by a tonic action of the

drug on the nerve which normally slows the heart—the pneumogastric; while the increased force of the heart's contraction is due to a tonic action of digitalis on the heart muscle itself. *The pulse is, therefore, slower and more firm after digitalis.*

Another effect of giving this drug is to *increase the quantity of urine excreted*. It is especially efficient when dropsy or œdema from deficient heart action, has occurred. This œdema is due to a lack of sufficient pressure in the heart to drive the blood through the capillaries and into the veins. The back pressure in the veins and capillaries forces lymph into the tissue spaces, and the individual is water-logged. Digitalis acts by allowing the heart sufficient time to drain its veins more effectually, while it also increases the force of the heart-beat and the pressure in the smaller arteries. This action promotes the absorption of the lymph into the capillaries and drains the water-saturated tissues.

The blood-pressure in the arteries of the kidney is also raised to a marked degree, so that more force is given to the filtration of the watery constituents from the blood, and their elimination in the form of urine. Thus, the action of digitalis on the urinary secretion seems to be more dependent on its action on blood-pressure than on any stimulating effect on the cells of the kidney itself.

CUMULATIVE EFFECT.—When digitalis is taken for too long a period, or in excessive doses, it produces a cumulative effect. This is because the active principles of this drug are absorbed and excreted very slowly. It takes from twelve to thirty-six hours to produce the characteristic action from an ordinary dose by mouth. So it is that when the drug has been administered for some time, excretion proceeds too slowly or absorption occurs too rapidly. This is the reason for the occurrence of the cumulative effect. The symptoms

of cumulation are a small, slow, and intermittent pulse, accompanied by feelings of weakness and faintness, and sometimes nausea and vomiting. The production of this condition is favored by constipation or gastritis. When these symptoms occur in a patient who has been taking digitalis for some time, they should always be recorded.

THERAPEUTICS AND ADMINISTRATION.—Digitalis is the crutch of the disabled heart. It is used in *valvular heart disease*, in *conditions affecting the nutrition of the heart*, such as occur in certain fevers, and as a *diuretic*, especially when *dropsy* or *œdema* occur.

The slowness of action of digitalis does not commend its use as an emergency heart stimulant. The comparative insolubility of digitalin makes its hypodermic use unreliable. It is therefore used more frequently for chronic than for acute conditions.

Given for long periods, it usually produces some irritation of the stomach; its cumulative action is not uncommon. Its most important use is in those heart conditions occurring when the heart valves are imperfect, the organ dilated and unable to empty itself, and the pulse small and rapid. Here, it slows the heart, allowing the auricles to fill more completely and increases the force of its contraction or systole. The auricles after its use are emptied more rapidly, and in this way the heart is rested and strengthened.

The *tincture*, *fluidextract*, and *infusion* are the preparations most frequently used. They are given in water, after food, in the doses mentioned at the beginning of this chapter.

STROPHANTHUS

The seeds of the *Strophanthus Kombé*. The active principle is a glucoside, *strophanthin* (strophanthinum), which is soluble in water. The physiological action of this drug

corresponds to that of digitalis; yet it does not raise the tension of the pulse or increase the urinary secretion to the same degree as the former drug. The *tincture* (Tinctura Strophanthi) is given in doses of 0.5 to 1 mil (℥ viii to xv). The glucoside, *strophanthin*, may be given hypodermically in doses of 0.0003 Gm. (gr. $\frac{1}{180}$).

POISONING.—Acute poisoning by digitalis or strophanthus is rare. Patients who take excessive doses usually vomit as a result.

For other remedies directly or indirectly stimulating the heart, see Ammonia, Strychnine, Caffeine, Alcohol.

CAMPHOR (CAMPHORA)

Camphor has long been employed as a stimulant to the heart and circulation when given by hypodermic injection in oil. Experimental evidence seems rather against its usefulness in these cases, and whatever its action may be its slow absorption renders it more or less uncertain as an emergency drug. Given by mouth, in collapse from various causes and the depression of fevers, etc., it seems to quicken the pulse and dilate the smaller blood-vessels. It is believed to act reflexly in these cases through its action on the stomach. Large doses may produce convulsions and coma. Externally it is used as a rubefacient.

The preparations used are: camphor-water (aqua camphoræ), 15 to 30 mils (ʒiv to ʒi); spirit of camphor (spiritus camphoræ), 1 to 2 mils (℥xv to ℥xxx); liniment of camphor (camphorated oil—linimentum camphoræ) used externally and by hypodermic injection up to 2 mils (℥xxx).

C. DRUGS WHICH RAISE BLOOD-PRESSURE

NUX VOMICA (POISON NUT)

This is the seed of the *Strychnos Nux-vomica*. Its active principle is an alkaloid called strychnine.

Strychnine *slows the heart*, acts as a *vasomotor stimulant* increasing the tension of the pulse and *increases the depth of respiration* through its action on the nervous centres in the medulla and spinal cord. Small doses of strychnia improve the appetite, slow and strengthen the pulse and sharpen the special senses. Poisonous doses produce stiffness in the muscles of the neck, contractions of the face muscles often resulting in a ghastly grinning expression, and marked convulsions frequently arching the body till only the head and feet touch the bed (*opisthotonos*). Death usually results from exhaustion and paralysis of the muscles of respiration. It is preceded by cyanosis.

THERAPEUTIC USES AND ADMINISTRATION.—Strychnia and *nux vomica* are given as *stimulants to the circulation and digestion*. Unlike digitalis, strychnia has no direct nutritive action on the heart muscle; its effects come chiefly through the nervous system. It is a much-used drug in general lack of tone, as it has a marked effect in such conditions. *Nux vomica* is frequently employed in diseases of the stomach and intestines. As an emergency heart tonic and respiratory stimulant, strychnia is frequently used, especially by hypodermic injection. The effects of overdoses are shown in muscular twitching and quick involuntary “starts.”

The preparations most frequently used are: strychnia sulphate (*Strychniæ Sulphas*), 0.001 Gm. (gr. $\frac{1}{60}$); Fluid-extract of *nux vomica* (*Fluidextractum Nucis Vomicae*), 0.06 mil (℥i); extract of *nux vomica* (*Extractum Nucis Vomicae*), 0.01 Gm. (gr. $\frac{1}{6}$); tincture of *nux vomica* (*Tinctura Nucis Vomicae*), 0.5 to 1 mil (℥viii to xvi).

TREATMENT OF POISONING.—If convulsions have not begun, produce vomiting with mustard water. If the patient has convulsions, give chloroform and wash the stomach with

a solution of tannic acid, a teaspoonful to a pint, or strong tea, or permanganate of potash solution, 1 to 6000. Chloral and the bromides should be given in double doses, by mouth or rectum. The patient should be frequently catheterized, and kept in a quiet, dark room.

ERGOT

A fungus obtained from rye; contains one or more alkaloids.

PHYSIOLOGICAL ACTION.—In moderate doses it raises the blood-pressure by stimulating the vasoconstrictor centre in the medulla, and also by a direct action on the smooth muscle of the blood-vessels themselves. This action on smooth muscle accounts for its effect in producing contractions of the uterus. In large doses it may cause nausea and vomiting. Long-continued use may bring about gangrene of the extremities, especially in the aged, *ergotism*.

THERAPEUTIC USES AND ADMINISTRATION.—Ergot is used to increase blood-pressure, especially in *certain forms of alcoholism*, as delirium tremens, when the pulse tension is low. It has a wide field in *uterine hemorrhage* on account of its action on uterine muscle.

The fluidextract (fluidextractum ergotæ) is given in doses of 2 to 4 mils (ʒss to ʒi); the extract (extractum ergotæ), 0.25 Gm. (gr. iv).

Several proprietary forms intended for hypodermic use—Ergotole and the like—are given in doses of 1 mil.

SUPRARENAL GLANDS (ADRENALIN, SUPRARENALIN, ETC.)

These solutions of the active principle of the suprarenal gland are of a strength of 1 to 1000. An exactly similar preparation is now made from a coal-tar derivative—pyrocatechin. Injected deeply into a muscle or into a vein in a

dose of 1 mil (m xv), these solutions give a brief action similar to that of digitalis—slowing and strengthening the heart and raising the blood-pressure. Their use by mouth gives no such action, and some authorities assert that they are equally inert when given under the skin. Applied locally to mucous membranes, these preparations contract the blood-vessels and blanch the part by their local action.

THERAPEUTICS.—Suprarenal gland (suprarenalum siccum) and adrenalin are much used in eye, ear, nose, and throat conditions. They are a valuable addition to cocaine in local anæsthesia,—1 to 300,000 is sufficient for infiltration. As a heart stimulant adrenalin acts rapidly but has a transient effect. For local hemorrhage it is sometimes efficient.

ADMINISTRATION.—For local use 1 to 1000 to 1 to 50,000 solutions are used. The solutions of adrenalin, suprarenalin, etc., on the market are 1 to 1000 strength. Adrenalin is said to lose its virtues by boiling; suprarenalin may be boiled. When given by hypodermic, it should be injected deep in the muscle; under the skin it is rarely efficient. Gangrene of the skin may follow its use.

PITUITARY GLAND (PITUITRIN)

Pituitrin (liquor hypophysis) is a substance isolated from the posterior lobe of the pituitary body of the sheep.

The action and uses of pituitrin resemble those of adrenalin, a marked rise of blood-pressure accompanying its intravenous injection, but lasting longer—from 10 to 30 minutes. After repeated doses the blood-pressure is lowered. The heart is not stimulated by it. A direct action on the muscular coats of the blood-vessels accounts for its action. Milk secretion is temporarily stimulated, diuresis is produced, and the uterine contractility is increased. Its use in large doses causes collapse.

Uses.—Pituitrin has its greatest field in delayed labor, where it is used to stimulate contractions of the fatigued uterus. It is also used to combat surgical shock. It is given by hypodermic, intramuscularly or intravenously, in solution—the dose being 16 to 20 M. (0.6–1.3 mls).

D. DRUGS WHICH LOWER BLOOD-PRESSURE

THE VASODILATORS

AMYL NITRITE (AMYLIS NITRIS)

This is a clear yellow liquid with an unmistakable, pungent odor. It is given by inhalation in a dose of 0.18 mil (℥iii).

Nitroglycerin has an action similar to amyl nitrite. It is given by hypodermic injection or by mouth in the form of the 1 per cent. spiritus glycerylis nitratis, in a dosage of about one minim (0.06 mil) containing 0.0006 Gm. (gr. $\frac{1}{100}$). A tablet containing this amount is much used.

Sodium nitrite gives a result more lasting than nitroglycerine. It is given in a dosage of 1 to 3 grains (0.06 to 0.20 Gm.) It is somewhat irritating to the stomach.

Sweet spirit of nitre (Spiritus Ætheris Nitrosi) is a well known household remedy. It contains 4 per cent. of ethyl nitrite in alcohol. The dose is 30 to 90 minims (2 to 6 mls) given in water.

PHYSIOLOGICAL ACTION.—When amyl nitrite is inhaled or nitroglycerin given by hypodermic injection, a flushing of the face and a throbbing of the temporal arteries occur. The pulse and respiration become hurried, and the blood-pressure falls and remains low for a little while. The effect of nitrite of amyl comes in about thirty seconds; of nitroglycerin in about ten minutes.

The lowering of the blood-pressure occurs because these

drugs, being absorbed, act on the nerves and muscle in the walls of the smaller arteries, causing the muscle to relax and increasing the calibre of the vessels, especially the vessels of the abdomen and brain. It is held by some authorities that they have an opposite effect on the vessels of the lung, contracting them till they are practically bloodless. These drugs do not act on the heart. They help the heart by lessening the pressure against which it works when that pressure is too high.

THERAPEUTIC USES.—These drugs are used in diseases accompanied by high blood-pressure—Bright's disease, uræmic coma, angina pectoris, and asthma. In pneumonia and in the hemorrhage from tuberculosis, the nitrites are also used.

QUESTIONS

1. What is aconite? To what does it owe its properties? Name two preparations and give doses.
2. How does aconite act on the sensory nerves? on the blood-vessels? on the heart? on the temperature?
3. What are the therapeutic uses of aconite? What are the symptoms and treatment of aconite poisoning?
4. What is hellebore? Does it contain an alkaloid? Give two preparations and doses. Compare the physiological action of this drug with aconite. What are its therapeutic uses?
5. What is digitalis? What important principle does it contain? Name three important preparations and their doses.
6. In what three ways does digitalis act on the heart? How does it relieve dropsy? How does it affect the kidney? What may occur when digitalis has been taken over a long period and why? How would you detect this condition?
7. For what purposes is digitalis given in therapeutics? Is it a good emergency heart stimulant? What are its disadvantages? How are the preparations given?
8. What is strophanthus? What is its active principle? How does it compare with digitalis in its physiological action? What are its properties? How should they be given and in what doses?

9. Name three drugs that primarily increase blood-pressure. What is ergot? How does it act in moderate doses? in large doses? What may occur after long-continued use of ergot?

10. What are the therapeutic uses of ergot? For what condition is it used in obstetrical practice? What is the use of the fluid-extract?

11. How do adrenalin and suprarenalin act? How are they given and in what doses? Are they effective when given by mouth? How do they act locally? What uses do they have in surgery?

12. What parts of the nervous system does strychnia affect most markedly? How does its action affect the heart? the pulse? the respiration? What is the effect of small doses of strychnia? of poisonous doses? How is death produced in strychnia poisoning?

13. For what purpose are strychnia and nux vomica used in therapeutics? How does the effect of strychnia on the heart differ from that of digitalis? Is strychnia a good emergency heart stimulant? What effect does overdosage produce? Give the names and doses of four preparations.

14. Give the treatment of strychnia poisoning.

IV.—DRUGS USED TO AFFECT THE ALIMENTARY FUNCTION

(A) DRUGS ACTING ON THE

STOMACH:

Bitter stomachics.

The aromatics or carmin

The aromatics or carmin-
atives.

Emetics.

(B) DRUGS ACTING ON THE IN- TESTINE:

(1) Drugs increasing peri-
stalsis: .

Cathartics.

Saline cathartics and
"salt action."

Vegetable purgatives:

Senna.

Cascara sagrada.

Aloe.

Purgative oils.

Mineral oils and enemata.

Peristaltic tonics:

Eserine and hormonal.

(2) Drugs decreasing peristal-
sis:

Opium.

(C) DRUGS ACTING LOCALLY ON THE ALIMENTARY TRACT AND ON ITS CONTENTS:

Digestants:

Pepsin.

Pancreatin.

The antacids.

The acids.

Hydrochloric acid.

Protectives:

Bismuth and cerium.

present. They are also useful as vehicles and flavoring agents and have antiseptic and anæsthetic properties.

Among the more important aromatics are peppermint and its products, oil of peppermint and menthol, oil of winter-green, capsicum, ginger and the flavoring oils and spices. These will be found under separate headings in the Reference Table.

IMPORTANT PREPARATIONS

Tincture of Capsicum (<i>Tinctura Capsicii</i>)	..5 to 15 M. (0.06-0.2 Gm.)
Menthol	1 to 2 gr. (0.06-0.12 Gm.)
Essence of Peppermint (<i>Spiritus Menthæ Piperitæ</i>)	..30 M. (2 mils)

Menthol, combined with various other aromatics, is much employed in the treatment of catarrhal affections of the nose and throat, being usually used in a solution in liquid petrolatum of 1 per cent. or less. As a counterirritant for neuralgia and headache it is a basic constituent of the many "analgesic balms" sold in the pharmacies.

EMETICS

Emetics are of two general classes: those which empty the stomach through action on the vomiting centre in the medulla, and those which act by irritating the mucous membrane of the stomach. Most emetics belong to the latter class.

Emetics are employed to empty the stomach of noxious or poisonous material and sometimes to relieve laryngeal spasm, as in the croup of children. As mentioned before, the emetic drugs in small doses increase bronchial secretion and act as expectorants.

Emetics should not be used when a rise of blood-pressure would be dangerous, as in senility, obesity, and arteriosclerosis, and should be used with caution in pregnancy.

Apomorphine Hydrochloride (apomorphinæ hydrochloridi) is an emetic acting on the vomiting centre. It is discussed fully with the preparations of opium.

Ipecac (ipécacuanha) is the root of the *cephælis ipécacuanhæ* and other species of the ipecac family, small shrubs which are native to South America. Ipecac contains three alkaloids, the most active of which is *emetine*.

PREPARATIONS

Ipecac (Ipecacuanha).....as an emetic 30 gr. (2 Gm.).
Hydrochloride of Emetine (Emetinæ Hydrochloridum),

gr. $\frac{1}{2}$ to $\frac{1}{4}$ (0.03-0.06 Gm.).

Powder of Ipecac and Opium (Pulvis Ipecacuanhæ et Opii (Dover's powder).....gr. x (0.6 Gm.).

Syrup of Ipecac (Syrupus Ipecacuanhæ)..as an emetic, ʒiv (15 mils); expectorant, M. xv (1 mil).

A number of mineral substances used as emetics are considered with "Astringents." A familiar household remedy often used as an emetic is mustard water, made by stirring a heaping teaspoonful of mustard into a glass of cold water. Concentrated salt water is another available emergency emetic.

The hydrochloride of emetine given by hypodermic injection, or in a tablet form not soluble in the stomach, has been very successfully used in amœbic dysentery and in the treatment of pyorrhœa alveolaris of amœbic origin.

B. DRUGS ACTING ON THE INTESTINES

(I) DRUGS INCREASING PERISTALSIS

CATHARTICS

The primary action of cathartics is to empty the bowels. The secondary effects to be obtained from this action include the lessening of intestinal intoxication, the depletion of the circulation, especially in the case of dropsical effusions, and

the removal of locally irritating substances from the bowel and rectum.

Cathartics act by stimulating the peristaltic action of the intestine and at the same time increase the bulk and fluidity of intestinal contents.

Peristaltic tonics simply increase the intensity of peristalsis and being given hypodermically have no local action on the mucous membrane of the intestine or on its contents.

The cathartics will be divided here into four main groups: (1) the saline cathartics; (2) the vegetable cathartics; (3) the purgative oils; (4) the mercurials. (Discussed under "Mercury.")

SALINE CATHARTICS AND "SALT ACTION"

Sulphate of Magnesia, Sulphate of Soda, Phosphate of Soda, Tartrate of Potassium and Soda

We have found that certain substances known as salts are much used in medicine. Physiology teaches that similar substances also exist in all of the tissues and fluids of the animal body. Of course all of these substances are absorbed through the stomach and intestine, and the rate of absorption of different chemical salts depends upon certain well-known physical laws, and also on certain less-known properties of living tissue. In general, it may be said that the constant effort of the body is to keep the amount of salts in the tissues at a certain definite concentration. It has been found that, normally, 9 parts of sodium chloride or common salt exist in every 1000 parts of human blood. So the sensation of thirst after taking an unusual amount of common salt in food is a wise provision of the body in calling for water to dilute the over-concentrated body fluids. Plainly, then, the various salts have various rates of absorption; some of them are readily absorbed, others not at all, and the

changes in the tissues of the body which result from these differences of absorption are known as "salt action."

To illustrate: If a dog with an open wound in his large intestine should be fed a normal salt (0.9 per cent.) solution, it will be found that little or no fluid will escape through the wound; most of it will have been absorbed before reaching that portion of the intestine. Let, however, a *weak solution of magnesium sulphate* or any of the other saline cathartics be fed to the animal, and very soon *fluid will flow freely from the wound*, showing that *it is not easily absorbed*. But, still further, if a *concentrated* solution of magnesium sulphate be administered, the fluid escaping from the wound will be *greater than the amount ingested*. The concentrated saline, therefore, not only is not absorbed itself, but prevents the absorption of the rest of the fluid portion of the intestinal contents. So, *chlorides*, as also *iodides* and *bromides*, and some *other salts*, are absorbed with more or less ease; but *sulphates*, *phosphates*, *tartrates*, and *especially the salts of magnesia*, are absorbed with difficulty and pass with the water dissolving them to the large intestine. If given in concentrated solution, these salts may even deplete the intestinal blood-vessels by robbing them of water. Since most of the fluid of the body is absorbed in the last portion of the small and one-half of the large intestine, the giving of a saline cathartic, which prevents this absorption, or even increases the secretion of fluid from the intestinal wall, produces the same effect, mechanically, as a high enema, and flushes the intestine from above.

PHYSIOLOGICAL ACTION.—The mechanical action of these drugs has already been explained, and also their power of absorbing water from the blood-vessels of the intestine. The vegetable cathartics act in a different way, that is, by irritating the nerves of the intestinal membrane and

increasing the contractions of the intestine (peristalsis, see physiology).

THERAPEUTIC USES.—These saline drugs are used as cathartics when a quick-acting and non-irritating purgative is needed, as in the headache and fever due to constipation and putrefaction of intestinal contents (so-called “bilious attacks”) and in the beginning of various *infections* and *contagious diseases*. Given in concentrated solution on an empty stomach, many of these purgatives will flush out the intestine within an hour.

When there is *dropsy*, as in heart, kidney, or liver disease, these remedies deplete the circulation of the abdomen by the evacuation of the fluid through the bowel.

MODE OF ADMINISTRATION AND DOSE.—*Sulphate of Magnesia* (Magnesii Sulphas—Epsom Salt).—Occurs as coarse crystals, soluble in 0.85 parts of water. The dose is 16 Gm. (ʒiv-½ to 1 tablespoon) in solution, preferably given in the morning in hot water, concentrated, and on an empty stomach.

Tartrate of Potassium and Sodium (Sodii et Potassii Tartaras—Rochelle Salt).—A white powder soluble in 1.2 parts of water. Dose 8 Gm. (ʒii)—2 teaspoonfuls. A well-known preparation is the *compound effervescing powder* or *Seidlitz powder*. The blue paper contains bicarbonate of soda, 2.58 Gm. (gr. xi); Rochelle Salt, 7.75 Gm. (ʒii). The white paper contains tartaric acid, 2.25 Gm. (gr. xxxv).

On dissolving each in one-half glass of water and mixing the solutions, an effervescing draught is produced.

Phosphate of Soda (Sodii Phosphas).—Occurs as a granular powder. The dose is the same as Epsom Salt. Another favorite saline purgative is the *solution of the citrate of magnesia*. This is given in a dose of ½ to 1 bottle, i.e., 180 to 360 mls. “Milk of magnesia” is a tasteless

liquid preparation used especially for infants in the dose of one to four teaspoonfuls.

VEGETABLE PURGATIVES. SENNA, CASCARA, AND ALOES

Senna is the dried leaves of the *Cassia acutifolia* and is raised extensively in Egypt. It contains a glucoside, cathartinic acid.

The best known preparation of senna is the compound licorice powder (*pulvis glycyrrhizæ compositus*), which contains in addition sulphur, sugar, licorice, and aromatics. The dose of compound licorice powder is 4 Gm. (ʒi). There is a fluidextract, a syrup, and also the compound infusion of senna.

Cascara Sagrada, the dried bark of *Rhamnus Purshiana*, contains a glucoside called cascarin.

The fluidextract and aromatic fluidextract are given in doses of 1 mil (℥xv). The extract has a dosage of 0.25 Gm. (gr. iv).

Aloe.—The evaporated juice of the leaves of several species of aloe. This also contains a neutral principle called aloin, which has the properties of the drug. Its preparations are as follows: purified aloes, 0.25 Gm. (gr. iv); extract of aloes, 0.125 Gm. (gr. ii); tincture of aloes, 2 mils (ʒss); aloin, 0.0065 Gm. (gr. $\frac{1}{8}$).

There are several official pills containing aloes. The pill laxative compound, known also as pill of aloin, strychnia, and belladonna, is much used.

The compound cathartic pill (*Pilulæ Catharticæ Compositæ*) contains calomel with colocynth, podophyllin, and other actively cathartic drugs.

Phenolphthalein, a coal-tar derivative, has recently been added to the list of purgatives. It is given in a dose of 0.06 Gm. (gr. i), preferably in pill or tablet.

PURGATIVE OILS

Castor Oil (Oleum Ricini).—A fixed oil expressed from the seed of the *Ricinus communis*. It contains a cathartic principle called ricinolein. The dose is 15 mils (ʒss).

Croton Oil (Oleum Tiglii).—A fixed oil expressed from the seed of the *Croton tiglium*. This oil contains crotonoleic acid, and the dose is 0.06 mil (m̄i).

PHYSIOLOGICAL ACTION.—On another page attention was called to the fact that saline cathartics act by preventing the absorption of water and keeping the intestinal contents liquid. Vegetable cathartics act in a different way. They irritate the terminations of the delicate nerves in the mucous membrane of the intestine. As a result, there is an increased blood supply to this membrane, and increased outpouring of the watery secretion of the glands, and also an increased vigor in the peristalsis, or movement, of the intestines through the greater irritability of its coat of muscle fibres.

Certain other remedies used in treating constipation, while not active purgatives, must be considered here.

MINERAL OIL AND ENEMATA

The use of *mineral oil* (also called Russian oil, and officially known as *Petrolatum Liquidum*, liquid petrolatum), in constipation introduces a class of remedies which may be said to act mechanically. *Petrolatum* is not absorbed, and softens up fecal masses in the colon and rectum, so as to allow of their easier expulsion. The average dose is ʒiv (16 mils) once to three times daily.

Enemata were considered under "Medication," and their technic is adequately covered in nursing manuals.

Agar, a dried mucilaginous substance extracted from certain Asiatic sea-weeds, has the property of absorbing

water very slowly and thus carrying fluid into the large bowel and rectum. It is fully considered in the Reference Table. Its average dose is $\mathfrak{z}$ iiss (10 Gm.), to be eaten mixed with cereal, preferably in the evening.

There are no satisfactory purgatives that may be given by hypodermic injection.

Purgatives have been arbitrarily divided into laxatives, cholagogues, cathartics, etc. But this division is only a question of the relative strength of the various drugs. A laxative given in a large dose will have a cathartic action; a cathartic given in a small dose will act as a laxative.

THERAPEUTIC USES.—In ordinary constipation the vegetable purgatives, singly or combined, have a frequent use. For habitual constipation, a laxative pill of a purgative with belladonna and strychnia is most frequently employed.

Purgatives are much employed at the onset of fevers (see calomel), in disease of the brain, and in conditions in which dropsy or œdema is found.

When diarrhœa is caused by irritants in the intestine, purgatives aid the natural effort of the bowel to expel the irritating substance. *Castor oil* has a frequent use in this form of diarrhœa. When a drug of small bulk is desired, as in mania, uræmic coma, eclampsia, etc., croton oil is frequently mixed with olive oil and dropped on the tongue. Aloes is given in amenorrhœa to increase the blood supply of the pelvis. The use of the liquid petrolatum, or mineral oil, together with agar has many advocates in the treatment of chronic constipation.

All purgatives act as intestinal antiseptics and remove from the intestine decomposing food, the absorption of which causes the well-known autointoxication, symptoms of lassitude, furred tongue, headache, etc., commonly known as "biliousness." As a matter of fact, few purgatives increase

the flow of bile; there are few true cholagogues. Bile is necessary in the intestine to make resinous purgatives active.

TIME REQUIRED TO ACT.—Large doses of croton oil act inside of two or three hours. An eruption and violent intestinal irritation may follow excessive doses.

Cascara, castor oil and senna require from five to ten hours. Aloes and aloin take twelve hours or longer to give their full action. The saline purgatives, it will be remembered, act in one or two hours.

CONTRA-INDICATIONS.—Mild purges should not be given in obstinate constipation, for here they only produce unproductive intestinal spasm and colic. An effective enema should be given when this result occurs. In menstruation and in pregnancy, violent purges, especially of aloes, etc., may cause increased uterine congestion, even up to the point of abortion. In collapse and intense anæmia, drastic purgatives are not to be used; enemas or mild purgatives are preferable. The property of aloes in increasing the pelvic and especially the rectal blood supply, renders the use of aloes inadvisable in persons suffering from hemorrhoids.

ADMINISTRATION.—Many of the vegetable purgatives are given in pill form. The compound licorice powder gives senna in an agreeable form for children. Castor oil is best given floated on the foam of carbonated water after being chilled by ice or in orange juice or brandy. Many, so-called, tasteless castor oils are sold for the use of children; also castor oil is furnished in flexible gelatin capsules.

THE PERISTALTIC TONICS

ESERINE AND HARMONOL

Physostigmine or eserine (see p. 131) is used by hypodermic injection in intestinal atony to increase the peristalsis by stimulating the smooth muscle of the intestine.

Hormonol, a fluid rich in cholin, prepared from the spleen of an overfed rabbit, has a similar action and use. It is not official. Hormonol is given by hypodermic injection in rather large doses (see p. 184).

(2) DRUGS DECREASING PERISTALSIS

OPIUM

Opium and its alkaloids decreases both the secretion and peristaltic action of the intestines. Its action is described on p. 72.

C. DRUGS ACTING LOCALLY ON THE ALIMENTARY TRACT AND ON ITS CONTENTS

A number of drugs are used to modify the nature of the contents of the alimentary tract, as the *digestants*, pepsin, pancreatin, etc., the *acids*, as hydrochloric acid, and the *antacids*, as sodium bicarbonate, etc., while others act locally as protectives to the mucous membranes, usually also with a slight astringent action.

DIGESTANTS

PEPSIN

Pepsin occurs in the form of yellowish scales. It is obtained by scraping the lining of the pig's stomach and drying the resulting glutinous material on glass plates. It is used in combination with diluted hydrochloric acid when the stomach secretions are known to be deficient. The dose of pepsin is 0.3 to 0.6 Gm. (gr. v to x). Several palatable preparations of pepsin are largely and often needlessly used as vehicles for other medicines, as essence of pepsin, elixir of lactated pepsin, etc. These are given in dosage of 4 to 16 mils (℥i to ℥iv) after meals.

PANCREATIN

Pancreatin is a grayish powder obtained by drying the juice of the pancreas of the pig. It is used in indigestion

of intestinal origin, in doses of 0.1 to 0.3 Gm. (gr. ii to v), given two hours after meals.

THE ANTACIDS

The carbonate and bicarbonates of sodium and potassium are alkaline in reaction and decompose acids. The carbonate of calcium, or chalk, is one of the insoluble mild alkalies, while the oxide and carbonate of magnesia are laxative as well as antacid.

The bicarbonate of soda and the carbonate of calcium (or prepared chalk) are much used in gastric hyperacidity, having a purely chemical action in neutralizing the over-acid stomach contents. The familiar lime-water is also used for the same purpose. The heavy calcined magnesia and the milk of magnesia are laxative as well as antacid.

Bicarbonate of soda has come into use recently as the most reliable remedy in the treatment of *acidosis*, given either by mouth, or in 4 to 5 per cent. solution intravenously, or by rectum. As a preventive of acidosis following anæsthesia it is frequently given in 4 per cent. solution together with 4 per cent. dextrose, per rectum, before and after operation. When a solution of bicarbonate of soda is boiled it changes into the carbonate, which is a much more irritating salt. The bicarbonate should be sterilized by dry heat and dissolved in sterile water as needed, especially if the solution is to be used intravenously.

IMPORTANT PREPARATIONS AND DOSES

Bicarbonate of Soda (<i>Sodia Bicarbonatas</i>)	Dose gr. xv (1 Gm.)
Prepared Chalk (<i>Creta Præparata</i>)	Dose gr. xv (1 Gm.)
Lime-water (<i>Liquor Calcis</i>)	Dose ʒiv (15 mls)
Heavy Magnesia (<i>Magnesii Oxidum Ponderosum</i>),	
	Dose gr. xxx (2 Gm.)
Milk of Magnesia (<i>Magma Magnesiae</i>)	Dose ʒiiss (10 mls)

THE ACIDS

HYDROCHLORIC ACID

Hydrochloric acid is used in medicine in the form of the diluted hydrochloric acid, which contains 10 per cent. absolute acid, about one-third the strength of the concentrated.

The stomach normally contains in the gastric juice about 0.2 per cent. of hydrochloric acid. In cases of deficient acid secretion this remedy is administered after meals, well diluted, through a tube, as otherwise the teeth may be corroded. The mouth should be well rinsed afterward. The average dose is *mxv* (1 mil).

PROTECTIVES

BISMUTH AND CERIUM

Subcarbonate of bismuth is a white, heavy, insoluble powder. It is a protective and mild astringent, and is used in therapeutics to protect irritated mucous membranes. Hence, it is given by mouth in irritable vomiting, gastric ulcer, and as a protective and astringent in diarrhœa. Locally, "bismuth paste" is injected into tuberculous sinuses, and large amounts of bismuth are given by mouth by the radiographer in order to obtain details of the alimentary tract in X-ray plates.

Dose 0.5 to 4 Gm. (gr. viii to ʒi) in powder or suspended in mucilage. It colors the stools black. After extensive use of bismuth salts, either internally in large doses, or locally, as bismuth paste, certain toxic symptoms have been noticed, including gastric and intestinal irritation, a black line around the gums, and prostration with great depression of the circulation. These symptoms should not go unobserved; they are more noticeable when the subnitrate is used.

Oxalate of cerium resembles bismuth subnitrate in its physical as well as its therapeutic properties, but its dose is 0.06 to 0.3 Gm. (gr. i to v).

QUESTIONS

1. What is meant by salt action? How does salt action affect the saline cathartics? Name three saline cathartics and state briefly how they act. What are their therapeutic uses? How do they relieve "bilious attacks"? Give the doses and mode of administering three saline cathartics.

2. Name two emetics easily obtained.

3. Name three vegetable purgatives. What vegetable purgative does compound licorice powder contain? What is the active principle of cascara? Give doses of two preparations of the latter. What is the active principle of aloë? What is the dose of aloë? of its active principle? What is the compound laxative pill?

4. Name two purgative oils. Give the dose of each. How does the action of vegetable purgatives differ from that of saline purgatives? Give several conditions in which vegetable purgatives are useful. Why are they used in "biliousness"?

5. How long a time is required for the action of croton oil? of castor oil and cascara? of aloes and aloin? When are purgatives contra-indicated? Give the best method of administration of senna, of castor oil, of cascara and aloin.

ALTERATIVES AND DRUGS MODIFYING METABOLISM

A. Alteratives:

The iodides.

Arsenic.

Iron.

Mercury.

Thyroid extract.

B. Hematinics:

Iron.

Arsenic.

C. Drugs which increase immunity:

Antitoxins and vaccines.

Tuberculins.

A. ALTERATIVES

A number of drugs have been grouped together as "alteratives," or "tonics," whose beneficial action is based

more on clinical experience than exact physiological knowledge. There is, of course, a chemical reason for the action of iron, and, for the antisyphilitic remedies, a biological reason—but to explain the action of arsenic and mercury in non-specific anæmia, for example, is not so easy.

THE IODIDES

Iodide of	{	Potassium.	Potassii	}	Iodidum.
		Sodium.	Sodii		
		Ammonium.	Ammonii		

All of these salts resemble their sister salts, the bromides, in many respects. All possess a salty taste and are freely soluble in water. One hundred Gm. of iodide of potassium will dissolve in 75 mils of water at ordinary temperature.

PHYSIOLOGICAL ACTION. *Excretion.*—Iodides are excreted by the skin and mucous membranes, and are supposed to owe their virtues to the liberation of iodine in these and other tissues of the body. It is for this reason that iodides are known as alteratives,—from their supposed ability to stimulate tissues to healthy reaction.

Iodism.—Some individuals cannot tolerate even small doses of the iodides—they are said to have an *idiosyncrasy* toward this drug, which means an unexplained susceptibility to its action. In such individuals, or when fairly large doses have been taken, symptoms referable to *iodism*, i.e., iodide saturation, appear. First, the patient complains of frontal headache, then a catarrh of the nose may appear, with reddened eyelids, or sneezing, or sore throat. Very often skin eruptions similar to those seen in *bromism* appear. These symptoms are due to the irritating and stimulating action of iodine on the lining membrane of the nose, throat, and trachea. When a patient is taking iodides, the fore-

going symptoms should be carefully watched for and placed on the record when they appear.

THERAPEUTIC USES. *Antisyphilitic.*—Iodides are almost specific in their action in the later stages of *syphilis*. Doses even up to 4 Gm. (ʒi) three times daily are used in this disease, especially when the brain is involved.

Expectorant.—Their stimulating action on the bronchial mucous membrane render iodides invaluable in coughs and asthma where the bronchial secretion is scanty.

Alterative.—In the so-called *chronic rheumatisms* and in *pleurisy with effusion*, iodides have long been credited with curative or palliative virtues. The many patented “sarsaparilla” nostrums contain iodides. Also in *thyroid gland diseases*, in *arteriosclerosis*, and in *lead and mercury poisoning*, iodides have been used extensively.

PRECAUTIONS.—Since iodides are excreted by the skin and mucous membranes, they are liable to irritate these membranes. Therefore, patients should be carefully and frequently bathed, and their teeth and mouths cleansed and frequently examined. Gastric irritation is not uncommon among those who take iodides.

ADMINISTRATION.—All the iodides may be given in doses of from 0.5 to 4 Gm. (gr. viii to ʒi). They are usually given in a saturated solution, one drop of which contains about one grain of the drug. The dose is increased by one drop daily until the desired amount is given, or symptoms of iodism appear. Milk is a good fluid in which to give iodides. Iodides should be given about an hour after food.

Two syrups containing iodine are used in medicine: *syrup of hydriodic acid*, dose 2 to 4 mls (℥xxx to ʒi), and *syrup of iodide of iron*, dose 0.5 to 1 mil (℥viii to xv).

Tincture of iodine (*tinctura iodi*), about 7 per cent. iodide—dose ʒiiss (0.1 mil)—is used as a counterirritant and antiseptic externally; internally in thyroid disease.

ARSENIC (ARSENI TRIOXIDUM)

ARSENIC TRIOXIDE, ARSENOUS ACID, WHITE ARSENIC

The metal arsenic of itself is not used in medicine. The trioxide, one of its salts which has a very extensive use, is a white lumpy powder, very slightly soluble in water, and with a slightly sweetish taste.

PHYSIOLOGICAL ACTION.—On the *skin*, when applied for some time, it acts as an irritant or corrosive. The *nervous system* shows disease of the nerves, especially of the extremities (neuritis) after poisonous doses, proving that the drug stimulates or irritates these nerves. On the *stomach* it acts as an irritant, increasing the blood supply. On the *blood* it is believed to exert an influence through the red bone-marrow, influencing the latter to form more red cells. On the *viscera*, fatty degeneration of the liver, kidney, etc., has been noticed after large doses. However, in spite of its powerful irritant and caustic effects on the body tissues, a decided tolerance may be established for arsenic by gradually increasing the dosage. In certain parts of the Tyrol and Styria natives eat an earth containing arsenic to improve their personal appearance, and consume large quantities of the poison with apparently no ill effects.

THERAPEUTIC USES.—As a *caustic*, on account of its corrosive action, it is used as a paste in cancer, to destroy the nerve pulp of teeth in dentistry, and whenever a slow-acting caustic is needed. In the various blood conditions known as *anæmias*, especially those in which the number of red cells is diminished, arsenic is used extensively. In *neuralgia* and *chorea* it is employed for its supposed stimulating effect on nervous tissue, and in certain *chronic skin diseases* it is also given internally. The well-nigh specific effects of salvarsan (606) and neosalvarsan in syphilis, especially in removing

the secondary lesions, are well known. It must be used in repeated doses, alternating with mercurial treatment. In disease of the kidneys and the blood-vessels its use is not advised, as sudden fatalities have occurred following injection in these conditions.

UNTOWARD EFFECTS.—When arsenic has been given for a while and the dose is gradually increased, most individuals show a peculiar puffiness of the eyelids. This symptom should be looked for and recorded on the chart if seen, whenever a patient is given an arsenic preparation. This oedema of the eyelids, like *iodism* and *bromism*, is evidence that the therapeutic limit has been reached in the dose of the drug.

PREPARATIONS, DOSES, AND ADMINISTRATION.—*Solution of Arsenite of Potassium* (Liquor Potassii Arsenitis—Fowler's Solution). *Solution of Arsenate of Sodium* (Liquor Sodii Arsenatis). *Solution of Iodide of Arsenic and Mercury* (Liquor Arseni et Hydrargyri Iodidi—Donovan's Solution).—All of these preparations contain 1 per cent. of arsenic. They are best given in water after meals, in increasing doses, till the desired effect is obtained. The dose to begin with is usually 0.2 mil (℥iij), increased by one drop daily. Fowler's solution is used almost to the exclusion of the other preparations.

The arsenic trioxide, in its original form, is given in pill or tablet 0.002 Gm. (gr. $\frac{1}{30}$), gradually increased. Three non-official pills, Blaud's compound pill, pill of quinine compound, and pill of sumbul compound, contain arsenic.

Salvarsan (606) is an organic compound of arsenic. It occurs as a sulphur-yellow powder in small sealed glass tubes, which is rendered easily soluble in water by the addition of an alkali. The average dose is 0.6 Gm. in alkalinized solution given intravenously. It is too irritating to be used

subcutaneously. *Neosalvarsan*, a soluble modification, is given in an initial dose of 0.8 Gm.

POISONOUS DOSES, SYMPTOMS AND TREATMENT.—Two kinds of arsenical poisoning may occur, the acute and the chronic. The acute usually occurs from the swallowing of rough-on-rats, Paris green, or the ordinary white arsenic or its official preparations, through mistake or with suicidal intent; the chronic, through inhalation of arsenic dust from wall-paper, or in certain occupations.

Acute Arsenic Poisoning.—The patient complains of a tightness in the throat, and great pain in the stomach region. Diarrhœa occurs, culminating in typical rice-water stools. There is much prostration, retching, and vomiting, and often complete suppression of the urinary secretion. Violent headache and pains in the muscles, followed by collapse and coma, occur in fatal cases. Death may ensue in twenty-four hours or may be delayed some days.

Treatment of Acute Poisoning.—Evacuate the stomach immediately, either by the administration of mustard water, or apomorphine, gr. $\frac{1}{10}$, by hypodermic, or by the stomach tube. Wash the stomach out well if the latter is used. The hydrated oxide of iron and magnesia is the official antidote for arsenic, but it is seldom available and there is much doubt as to its efficiency, or the efficiency of any chemical antidote for arsenic. Keep the patient quiet, and if the diarrhœa has not commenced, give by rectum 250 mls of coffee (℥viii) made very strong. Morphine may be required for the pain and diarrhœa.

IRON

Iron differs from most metals in being found in, and being essential to, the structure of many if not all forms of living matter, both animal and vegetable. There are,

therefore, two kinds of iron compounds—the organic and the inorganic. The ordinary salts of iron are types of the inorganic iron; the hæmoglobin of the blood, the type of the organic or albumin iron.

PHYSIOLOGICAL ACTION.—When a solution of a soluble iron salt, such as the chloride, is added to albumin, it precipitates the latter, forming a compound known as an albuminate. Mercury preparations destroy and corrode albumin; iron, however, simply makes the albumin insoluble, and has no corrosive action.

Therefore when a soluble preparation of iron is taken by mouth, an astringent metallic taste is produced, and in ordinary doses, no other effect is observed. Disturbance of the stomach and bowels may come from large quantities of iron at one time, and vomiting, gastritis, etc., may be the result. Constipation and dyspepsia may follow the long-continued use of iron salts, but the chief use of iron, therapeutically, is its long-reputed ability to increase the content of hæmoglobin in the red blood-cells, as well as its stimulating action in increasing the number of white cells. How and where iron is absorbed has long been a problem.

Absorption.—Iron is changed to an albuminate of iron in the stomach, and as such passes to the small intestine. Here, and in the large bowel, part of it is absorbed and passes into the portal circulation. By this route the organic iron passes to the spleen and then to the liver, and perhaps later, through the general circulation, to the bone-marrow. It is most likely that hæmoglobin is manufactured in the liver from the ingested iron. The normal amount of iron absorbed in a day by an adult person is 0.01 Gm. or gr. $\frac{1}{6}$, hence the uselessness of large doses which may irritate the large bowel or cause constipation.

THERAPEUTIC ACTION.—As a *hæmatinic* or blood builder,

iron is used in chlorosis and other anæmias, especially when the hæmoglobin is deficient. It should not be used in fever nor in persons of a plethoric constitution, nor in patients with a gastritis of a severe grade.

As an *astringent*, the tincture of chloride of iron is used in combination with glycerin as an application in tonsillitis. Various salts and solutions of iron have been used to apply to bleeding points as a *styptic*, but have fallen into disfavor in recent years. The *sulphate* (copperas) has some use as a disinfectant of vaults, etc.

IMPORTANT PREPARATIONS AND ADMINISTRATION.—Pills of carbonate of iron (Pilula Ferri Carbonatis—Blaud's pills), dose 2 pills; tincture of chloride of iron (Tinctura Ferri Chloridi—muriated tincture), 0.5 mls (℥viii); solution of acetate of iron and ammonia (Liquor Ferri Ammonii Acetatis—Basham's mixture), 16 mls (℥iv); elixir of phosphate of iron, quinine, and strychnia (elixir F. Q. & S), 4 mls (℥i); sulphate of iron (Ferri Sulphas—copperas), 0.125 Gm. (gr. ii).

All iron preparations should be given after meals to avoid stomach irritation. They should not be given in milk, except the unofficial peptonate of iron and manganese, which may be so given. Iron salts color the stools black when given internally and may discolor the teeth if the mouth is not well rinsed afterwards. Tincture of chloride of iron and syrup of iodide of iron should be well diluted and taken through a glass tube.

MERCURY

The very soluble salts of mercury are very poisonous; the less soluble and insoluble salts are less poisonous. Mercury salts combine rapidly with albumin, destroying it and forming an albuminate which is quickly absorbed. By this

property, which is shared by most germicides, the soluble salts of mercury kill germs and prevent their growth, hence they are *germicides* and *antiseptics*. Locally applied in strong solution, soluble salts of mercury are *caustic*.

PREPARATIONS.—*Mercury* (Hydrargyrum—quicksilver) in its metallic form is used as the mass of mercury (blue pill) and mercury with chalk (gray powder), both of which are given in doses of 0.25 Gm. (gr. iv). Externally an ointment (blue ointment), a plaster, and the ointment of ammoniated mercury (white precipitate) are used.

Corrosive Chloride of Mercury (Hydrargyri Chloridum Corrosivum—Corrosive Sublimate, Bichloride of Mercury, Mercuric Chloride).—This white crystalline powder is soluble in water and alcohol, about one part dissolving in sixteen of water. The addition of common salt or sal ammoniac makes it more soluble. The dose for internal use is 0.003 Gm. (gr. $\frac{1}{20}$).

Calomel (Hydrargyri Chloridum Mite—mild chloride of mercury, mercurous chloride) is almost insoluble. It acts as an antiseptic on the stomach and intestinal contents, preventing fermentation and putrefaction. It is the most satisfactory intestinal antiseptic. By its irritant action on the walls of the intestine it stimulates intestinal secretion and intestinal movements, and hence is a violent cathartic, but has no action in increasing the secretion of bile by the liver. It relieves the liver by emptying the intestine. The green color of the stools is characteristic of calomel purgation even when bile is absent. Calomel also acts as a stimulant to the kidneys by a direct action on the secreting tubules (see physiology).

• All the salts of mercury stimulate the building-up and breaking-down processes of the body tissues, known as metabolism, and are believed to have an especially beneficial

action on the blood. Calomel is a white, insoluble, tasteless powder. As a purgative it is given in four to eight fractional doses every half hour to a total of 0.06 Gm. (gr. i), or in a single dose up to 0.5 Gm. (gr. viii).

The Compound Cathartic Pill contains calomel.

Green Iodide of Mercury (Hydrargyri Protoiodi—Proto-Iodide of Mercury).—This is an insoluble salt used principally in pill form in doses of 0.01 Gm. (gr. $\frac{1}{6}$), gradually increased to the point of extreme toleration.

The ointment of mercury (Ungentum Hydrargyri) is frequently given by inunction, rubbing a certain quantity on a portion of the skin surface of the body at intervals of a day to a few days, to obtain the constitutional effects of mercury.

POISONING.—The *soluble* salts of mercury may cause *acute* poisoning; the *insoluble* ones most frequently cause the *chronic* form of poisoning. The *bichloride* (corrosive sublimate), taken in concentrated solution, will cause great pain, vomiting, a sense of burning in the stomach, and even convulsions and death. The antidote is milk or eggs in large quantities, the promotion of vomiting, and strong coffee by rectum.

Chronic mercurial poisoning (salivation) sometimes follows the administration of the mild chloride or other more or less insoluble salts of mercury, when they are allowed to remain for too long a period in the intestinal canal. For this reason a saline purgative is usually prescribed to follow calomel.

Some individuals are very susceptible to mercury. The symptoms of salivation are a metallic taste, sore gums, ulcerations, loose teeth, loss of appetite, skin eruptions, etc.

Often increasing doses of mercury are given till the therapeutic limit is reached. In patients taking mercury,

soreness of the teeth on biting hard should always be looked for and placed on record when found.

THERAPEUTIC USES.—As an *antisyphilitic*, especially in the earlier stages of the disease, the *green iodide*, the *gray powder*, the method of inunction, and the “mixed” treatment are used. The “mixed” treatment consists of a combination of bichloride of mercury in solution with iodide of potassium.

As a *diuretic*, calomel in the form of Niemeyer’s pill, a combination of calomel, digitalis, and squill, is much used in chronic Bright’s disease, cirrhosis of the liver, and similar conditions.

As an *antiseptic* and *germicide*, the bichloride is used in solutions of 1 to 500 to 1 to 10,000 in strength. To kill *parasitic insects*, lice, etc., the *ointment of ammoniated mercury* and the *blue ointment* are used.

As a *purgative* and *intestinal antiseptic*, calomel has the greatest use. Children of any age may be given relatively large fractional doses, without ill effects. *Gray powder* is much in favor as an antisyphilitic for children.

THYROID EXTRACT (THYROIDEUM SICCCUM)

Thyroid gland and its extract when given in sufficient quantities have a marked action on the circulation and nervous system, as well as on the general nutrition. The pulse is quickened, the blood-pressure falls, while tremors in the limbs, loss of appetite, and diarrhoea, loss of flesh, excessive perspiration, and thirst are not unusual symptoms. Sugar and albumin often are found in the urine after thyroid treatment. The dried gland is used in medicine in dosage of 0.2 to 0.3 Gm. (gr. iii to v). Iodothyrim, an iodine compound, is believed to represent the active principle of the gland.

THERAPEUTICS.—The dried gland is administered when,

through disease or other injury, the normal secretion of the thyroid gland is lessened in amount. It seems that this gland gives to the blood substances necessary to the proper nutrition and nervous tone of our bodies. Certain rare forms of goitre and the diseases known as cretinism and myxœdema are conditions in which thyroid treatment accomplishes good results. Many advertised obesity cures contain thyroid extract. Its indiscriminate use, however, is dangerous, and it is also not very effective in reducing weight.

C. REMEDIES WHICH INCREASE IMMUNITY

ANTITOXINS AND VACCINES

When a bacterium produces an infection in an animal and proceeds to multiply and manufacture its particular poison or toxin, one of two things happen; either the bacteria increase in great numbers very rapidly and overwhelm the animal with a large amount of toxin, and death results, or they do not increase so rapidly, and the animal gradually recovers from the disease. Assuming for both animals an equal virulence of the infection, it would seem that the "resistance" of the recovered animal was better than that of the one that died. If the body has sufficient time and vitality for the work, it will manufacture its own antitoxin and recover from the disease. The power to neutralize the poison of the disease will remain in the animal's blood for a considerable time after recovery has taken place. These immunizing or antitoxic principles may also be generated in an animal either by injecting small quantities of attenuated bacterial cultures, or cultures of dead bacteria, or by simply injecting solutions of bacterial toxins. The practical utilization of this principle is seen in diphtheria antitoxin.

DIPHtheria AND OTHER ANTITOXINS

This antitoxin is the purified blood serum from a horse that has been rendered immune to the disease by gradual inoculation.

Diphtheria antitoxin is obtained by injecting into a healthy horse an amount of filtered culture of the diphtheria bacillus, sufficient to make him ill, but not to produce death. When the animal has recovered from this injection, twice the amount is given to him, and this procedure is kept up until a dose one thousand times as strong as the original one has been given. The horse's blood is now loaded with antitoxic substances. From three to six litres of blood are withdrawn from the horse's veins; the blood is allowed to clot; the serum decanted and preserved by the addition of cresol or phenol.

The strength of this serum is expressed in *antitoxic units*. A unit is that amount of serum which will completely neutralize the effect of 100 lethal doses of toxin in a guinea-pig weighing 250 grammes.

Diphtheria antitoxin is given in order to produce in the affected individual a passive immunity against the toxin produced by the invading diphtheria bacillus.

When this serum is injected into another animal, it renders diphtheria toxin harmless to that particular animal. Analogous preparations are used with good effect in epidemic meningitis and in tetanus.

Tetanus antitoxin has an extensive use as a preventive measure against tetanus in deep infected wounds. It is also used, but not so successfully, in the treatment of acute tetanus.

Antistreptococcus serum has been used in streptococcus infections, but the results have not been encouraging. The Rockefeller Institute has developed two types

of serum corresponding to two large type groups of pneumococci. Cultures of sputum from the pneumonia patient injected into the peritoneum of a mouse are used to develop the type of coccus prevailing, and the type of serum which will agglutinate this culture is used. 100 mls or more are given daily intravenously. Marked serum reactions often follow.

Antimeningococcus serum is a serum used in the treatment of meningococcus meningitis. When the infection is caused by exactly the same type of this organism as that used to cause the immunity in the animal from which the serum was obtained, the results of treatment are excellent. But it is believed that there are a good many "strains" or varieties of the bacteria of cerebrospinal meningitis.

VACCINES

Various bacterial vaccines, being emulsions of known quantities of killed bacteria, have come into use in the last few years. Their administration is believed to stimulate the various resisting forces of the diseased body to the production of antibodies, "opsonins," etc. Those of the pus-producing organisms are the most in vogue and are used in gonorrhœal arthritis, abscesses, acne, septicæmia, etc. Typhoid vaccine is used very successfully to produce immunity from the disease in the United States army, but its use in treatment seems limited and uncertain. The Pasteur treatment for rabies is practically a vaccine treatment.

TUBERCULINS

Tuberculins are filtrates, extracts, or suspensions of cultures of tubercule bacilli. They are used in the treatment of tuberculosis and in diagnosis. Very small quantities are given at first, the dose being started at fractions of a milligramme. Large doses produce very dangerous local and

general reactions. As a diagnostic agent the tuberculin is injected and a general febrile reaction is then looked for. Or it is rubbed into a tiny skin abrasion (Von Pirquet's test) or rubbed in an ointment on the unbroken skin (Moro's test), or dropped in the eye (Calamette's test), a slight inflammation in each case showing the reaction. *Bouillon filtrate*, a 6 weeks' culture filtered; *Old tuberculin*, a 6 weeks' culture concentrated by evaporation and *New tuberculin*, (T.R.) or tuberculin residue, an extract of killed bacteria, and *New tuberculin* (B.E.), an emulsion of killed pulverized bacilli are among the various modifications that are used.

ADMINISTRATION OF VACCINES AND ANTITOXINS.

Vaccines and serums are given by subcutaneous injection. In diphtheria, antitoxin is most frequently given between the shoulder-blades in doses of from 3000 to 10,000 units, repeated every eight hours if necessary until the temperature drops to at least 100° and other symptoms abate.

The antitoxins are given either hypodermically or intravenously, excepting in the case of the tetanus and meningitis sera, which in treatment are given by injection into the spinal canal. Immunizing doses of all of these sera are given hypodermically.

The immunizing dose of diphtheria antitoxin is about 1000 units. This gives a brief immunity—usually a few weeks. Many individuals have in their blood normally an immunity against diphtheria. A simple test, in which fresh toxin is injected between the layers of the skin and known as the Shick test, will show conclusively whether a person has a natural or acquired immunity. A red spot appears within 24 hours in the susceptible individual.

In the treatment of diphtheria many authorities recommend large initial doses of from 5000 to 10,000 units. Mixtures of toxin and antitoxin are sometimes used to produce a longer period of immunity.

Tetanus antitoxin is given in an immunizing dose of about 1500 units. In treatment from 25,000 to 200,000 units are injected into the spinal canal daily.

The vaccines are given with an ordinary hypodermic syringe, from 10 to 3000 millions of bacteria in each dose according to the requirements of the case, and repeated not oftener than every third day.

UNTOWARD EFFECTS.—Anaphylactic reactions or serum sickness, often appear in individuals who have been sensitized by previous injections of serum from animals or in susceptible persons. Alarming asthma, urticaria, œdema, headache, and collapse—any or all of these symptoms may occur in individuals with a natural or acquired sensitization.

QUESTIONS

1. Name three iodides. Why are they called alteratives? What is *iodism*? Describe its symptoms. What are the therapeutic uses of the iodides? What precautions should be observed in giving them? Give doses and administration.

2. What is the action of arsenic on the skin? the nervous system? the stomach? the blood? What is its use in therapeutics? What unusual effects may be produced by its continued use? Name three solutions of arsenic, and how and in what doses are they given? Describe the symptoms and treatment of acute arsenic poisoning. What is Fowler's solution?

3. Name a well-known form of organic iron. How does iron affect the blood? How is it absorbed and in what daily quantity? What are its therapeutic uses? Give the proper name and dosage of Blaud's pill, muriated tincture of iron, Basham's mixture, copperas, elixir of F. Q. & S.

4. How should iron be given in relation to food? How do iron preparations affect the stools?

5. How do mercury salts kill bacteria? Why are some salts of mercury more poisonous than others? What is the common name for mild chloride of mercury? What is the common name for the bichloride? Which causes acute poisoning? which chronic? Describe each form of poisoning. What is the treatment of acute poisoning? Name three preparations of metallic mercury, giving doses. What is the dose of the corrosive chloride? the mild chloride? the green iodide?

6. Name four therapeutic uses of mercury and its preparations. How used as a germicide? as a parasiticide? What is gray powder? Niemeyer's pill?

VI. DRUGS WHICH DESTROY THE CAUSES OF DISEASE

A. Anthelmintics:

Male fern (*aspidium*).

Wormseed (*santonica*).

Quassia.

Thymol.

B. Drugs which destroy protozoa:

Quinine (*Quinina*).

C. The disinfectants and germicides.

A number of diseases are caused or transmitted by living organisms, by bacteria, by the small parasites living in the body-fluids or tissues known as protozoa, and by animal parasites, usually worms, which inhabit the intestinal tract. Certain drugs and chemicals act on these organisms and destroy them, and are valued for this action rather than for any effect on the body-cells or fluids. We divide these remedies, therefore, into three main groups:

1. Drugs which destroy intestinal parasites—anthelmintics.

2. Drugs which destroy protozoa and other animal parasites.

3. Drugs which destroy bacteria—germicides.

Certain of these remedies are so poisonous to man that they can be used only outside the body; others are used internally, being more toxic to the parasites than to the body-cells.

A. ANTHELMINTICS

Anthelmintics, or vermifuges, cause the death or expulsion of intestinal worms. They usually act as muscle poisons to the parasitic worms, so that the latter are more easily expelled. It is essential, therefore, that in administering these remedies, the stomach and intestines should be almost empty, and they should be followed by a brisk purgative. It is best to give them in the morning and to allow the patient to take no food until noon. Calomel is frequently given with the anthelmintic medicine, or a saline purgative administered about four hours afterward.

MALE FERN (ASPIDIUM)

The European male fern (*Dryopteris filix-mas*) and the native (*Dryopteris marginal*) are used to obtain the official oleoresin of male fern (*Oleoresin aspidii*). This is a thick black liquid, with a disagreeable taste.

ACTION.—The male fern is a pronounced muscle poison, and while not usually absorbed, occasionally will produce convulsive movements, vomiting and purging. Blindness has resulted from excessive doses.

USES.—Oleoresin of male fern is employed in the cure of tapeworm. It is usually given in a *single* dose, while fasting, followed by a saline—never an oily purgative—the average single dose being gr. xxv (2 Gm.). Pumpkin seed and pomegranate are also used for this parasite.

WORMSEED (SANTONICA)

Levant wormseed consists of the unexpended flower-heads of the *Artemisia pauciflora*, and its active principle is *Santonin*. Santonin, although neutral in reaction, forms salts like an acid. It occurs in crystals which are soluble in alka-

line solutions. While it is not usually harmful in ordinary dosage, it may produce marked toxic symptoms when given in excess, or when absorbed too rapidly. Vomiting, pallor, epileptiform convulsions and a peculiar yellow vision are the poison symptoms. Free evacuation of the bowels should be used when these symptoms appear.

USES.—Santonin is a specific remedy for the destruction of the ascarides or round worms. It is best given in tablet or capsule in the dose of gr. i to gr. iv (0.06 to 0.24 Gm.) on an empty stomach, followed by calomel or a saline purgative. The urine is usually stained yellow by santonin.

QUASSIA

Quassia, used as an infusion for rectal injection in the treatment of pin-worm, is considered elsewhere.

THYMOL

Thymol is a camphor-like substance occurring in several essential oils, particularly the oil from *Thymus vulgaris*. It has a peculiar penetrating odor and taste. It is much used as an antiseptic in combination with other aromatic antiseptics in watery or oily solution in the treatment of nose and throat diseases. As a vermifuge it has been used with great success in the treatment of hook-worm disease, caused by the *Anchylostoma duodenalis*, as attested by the work of Ashford in Porto Rico. Ten to 30 grains (0.6–2 Gm.) are given in capsule every hour for three doses, followed by a saline purgative.

POISON SYMPTOMS are pallor, subnormal temperature, ringing in the ears, sweating and delirium. The urine becomes green. Absolute rest, stimulation and free evacuation is the treatment for poisoning with thymol.

B. DRUGS WHICH DESTROY PROTOZOA

A limited number of medicines when given by mouth in doses not poisonous to man are effective in destroying the small parasitic organisms which cause disease by propagating in the body-fluids. The uses of *emetin* in *amæbic dysentery* and of *mercury* and *salvarsan* and *neosalvarsan* in *syphilis* have been considered in other chapters. One of the most important remedies of the specific class remains to be considered—*cinchona bark* (*cinchona*, or in Europe, *Cortex Chinæ*) and its alkaloid, *quinine*.

QUININE (QUININA)

Quinine is an alkaloid obtained from various species of *Cinchona*, a tree native to South America, but cultivated in tropical climates. Several other alkaloids are found in *cinchona*, but *quinine* is most important.

PHYSIOLOGICAL ACTION AND THERAPEUTICS.—Quinine lessens the movements of the white cells of the blood, and lessens the activity of all of the cells of the body. Less body heat is produced on this account, so this drug has some antipyretic action. Malarial fever is due to a little parasite which multiplies in the red blood-cells. Quinine kills these parasites, having a specific effect on the cause of the disease, and causes the temperature to drop. Its antipyretic action is of less value in fever due to other causes.

Taken by mouth, it acts as a bitter tonic and *promotes gastric secretion*. It is used with great success in all forms of malaria, and in certain malnutritive conditions. It has become a household remedy in *colds* and *influenza*, but its use in these conditions does not seem warranted by its physiological action.

ADMINISTRATION.—The dose of quinine sulphate, bisulphate, and hydrochloride as a tonic is 0.06 Gm. (gr. i) three

times daily. In malaria it is given in doses of 0.25 Gm. (gr. iv) three or more times daily. The Elixir of Phosphate of Iron, Quinine, and Strychnia is given in the dose of 4 mils (3i).

Quinine is most frequently given in capsule or pill. For children, euquinine, tannate of quinine, and various vehicles such as syrup of licorice are used to eliminate the bitter taste.

UNTOWARD EFFECTS.—Even small doses of quinine will cause ringing of the ears in certain individuals. This is due to the congestion of the blood-vessels of the middle ear. Quinine should, therefore, never be given when earache is present. Gastric irritation and a papular or vesicular skin eruption may appear after its use.

Ringing of the ears, known as *cinchonism*, is present in nearly every case when the drug is given in full dosage, and if moderate in degree should cause no apprehension.

C. THE DISINFECTANTS AND GERMICIDES

Mercury.

Chlorine.

Hydrogen dioxide.

Solution of formaldehyde.

Sulphur.

Iodine.

Silver.

Manganese.

Salicylic acid and the salicylates.

Phenol (carbolic acid).

Urinary disinfectants:

Urotropin.

A large number of chemicals are known to be able to kill bacteria, and this includes many metallic salts, many compounds of bromine, chlorine and iodine and sulphur, oxidizing agents such as hydrogen peroxide, and a number of organic compounds such as phenol, alcohol, etc.,—so many that it is impossible to consider, or even to mention all of them here.

MERCURY

While mercury is considered elsewhere as a remedy, its use, and especially the utility of its bichloride as a disinfectant cannot be overemphasized. A solution of 1 to 20,000 will destroy most bacteria and cocci, and 1 to 1000 will destroy the spores of the anthrax bacillus. The presence of albumin greatly lessens the germicidal power of bichloride of mercury. It is exceedingly corrosive to metals. Its greatest value is, perhaps, in rendering the operative field and the hands of the surgeon sterile, and in its use as a disinfectant for various utensils and articles of furniture, etc. For this purpose a solution of 1 to 1000 is frequently employed. The specific action of mercury in killing the spirochæte of syphilis has already been discussed, and should not be forgotten.

CHLORINE

Chlorine is a yellow gas, very irritating to the respiratory passages, and was employed in the European war as an asphyxiating agent for that reason. It is extremely toxic to bacteria and the lower forms of animal and vegetable life, ranking next only to bichloride of mercury in effectiveness. It is used most frequently and most successfully in the disinfection of excreta. As chlorine is a powerful bleaching agent its other fields are limited. Either the Labarraques solution or chlorinated lime are used to disinfect stools and urine. The Dakin-Carrel solution used in military surgery as a dressing for infected wounds consisted in one of the early formulas of Labarraques solution, 200 mils. in which the strongly alkaline reaction had been neutralized by the addition of boric acid .4 Gm. and sterile water 800 mils.

A less irritating preparation of chlorine is Dichloramine-T., a 7 per cent. solution of an organic salt of chlorine in chlorinated oil of Eucalyptus mixed with chlorinated liquid

petrolatum, which is now being used in military hospitals. A 2 per cent. solution is used in the nose and throat in acute infections, colds, etc.

Liquor soda chlorinatæ (Labarraques solution)—Solution of Chlorinated Soda) is seldom used internally.

Calx Chlorinata (chlorinated lime—improperly called “chloride of lime”) is not used internally. Mixed with water it is available for use in stool disinfection and to disinfect privy vaults.

HYDROGEN DIOXIDE (AQUA HYDROGENII DIOXIDI)

This solution of dioxide of hydrogen contains about 3 per cent. by weight of pure dioxide, equivalent to 10 volumes of oxygen. In the presence of organic matter it decomposes with the liberation of free, nascent oxygen, coagulating albumin, and in this way destroying bacteria.

It is much used in infections of mucous membranes, especially of the mouth and throat, because of its non-toxicity, and as a cleansing agent for suppurating ulcers, etc., and as a deodorant. It is an active bleaching agent, and so cannot be used to disinfect clothing.

SOLUTION OF FORMALDEHYDE (LIQUOR FORMALDEHYDI)

Formaldehyde, or formol, is a gas produced by the oxidation of methylic alcohol. The official solution contains not less than 30 per cent. of the gas.

Formaldehyde is extremely irritating to the skin and mucous membranes, and coagulates albumin very rapidly when in concentrated solution. It does not decolorize, nor corrode metals, and is very effective in gaseous form, about 2 per cent. in the atmosphere effectively destroying bacteria in a room. For this reason it is a much used substance for fumigating rooms and clothing after contagious diseases.

Many processes are in use to accomplish this purpose—various lamps are sold to utilize the solution as a vapor,

or to oxidize alcohol directly or to use the solidified "paraform" as a source of the gas.

To FUMIGATE A ROOM.—A popular method is to add potassium permanganate to the solution of formaldehyde, intense heat and ready vaporization ensuing. Moisture in the room favors its action.

Having moved furniture to the centre of the room, suspended rugs and draperies, opened closets, drawers, etc., and sealed all cracks, keyholes, openings, etc., with paper, prepare a washtub by placing 6 inches of water in it and setting it in the middle of the floor. In this tub place a 5-gallon pail and place in the pail crystals of permanganate of potash proportionate to the air space of the room—250 grammes of the crystals to every 1000 cubic feet of air space. On these crystals pour formalin, 500 mls to every 1000 cubic feet of air space. A violent ebullition occurs with the discharge of quantities of formaldehyde gas. The room should remain sealed for twelve hours.

SULPHUR

Sulphur is employed as a fumigating agent, being burned to produce sulphur dioxide. It is a very corrosive and irritating gas. The familiar sulphur candle is a ready means of generating the gas. Moisture favors the action of sulphur dioxide gas. Sulphur is also used as an ointment in various parasitic diseases, and as a local application.

IODINE

Iodine, in the form of tincture of iodine is used to prepare the field of operation in surgical work. The official *Tincture of Iodine*, about 7 per cent. strength, is usually diluted with an equal bulk of alcohol, and the operative field, having been previously kept dry, is painted with the solution.

Iodoform (considered in the Reference Table) is a

stimulating dusting powder, which has a limited use in surgery because of its disagreeable odor.

The use of iodine externally in some individuals causes a dermatitis. The use of iodoform in cavities where it is readily absorbed will sometimes result in fever, delirium, a scarlet-fever-like eruption and other alarming symptoms.

SILVER

The two forms of silver most used in medicine are the nitrate and the various albuminates. The latter are proprietary preparations, and are, therefore, not in the Pharmacopœia.

Nitrate of Silver.—This occurs in the form of crystals, with a sharp, caustic, metallic taste. It causes whitening of the tongue when tasted. It is very soluble in water. It unites readily with albumin to form albuminates, and its caustic action is, therefore, not very deeply seated. It is much used in dilute solution as an *astringent* for mucous membranes. Moulded into sticks it is called *lunar caustic* and is used to cauterize ulcers and granulating tissue.

In *colitis* and *ulcers of the rectum*, nitrate of silver, 0.5 Gm. (gr. viii) to 500 mils, is frequently used as an injection, followed by salt solution. Internally, *nitrate of silver* is used in *ulcer of the stomach*. It is possessed of marked antiseptic and germ-killing properties, but it is rather irritating, and the fact that it stains the skin an indelible black makes its general use unpopular.

POISONING.—In concentrated solution, nitrate of silver acts as an irritant poison, producing vomiting, cramps, and prostration. The chemical antidote is common salt in teaspoonful doses. Chronic poisoning, characterized by darkening of the skin to a bluish tint, is called *argyria*. This comes from the too long-continued administration, internally, of silver nitrate.

The dose of nitrate of silver is 0.01 to 0.015 Gm. (gr. $\frac{1}{6}$ to $\frac{1}{4}$) given in pill form. The stools are colored black after its internal use.

Albuminates of Silver.—Several combinations of silver with albumin are extensively used in diseases of the eye, urethra, and other mucous membranes, since they are found to be less irritating than the other salts of silver and have valuable germicidal and astringent properties.

Argyrol is used in 10 per cent. solution to prevent ophthalmia in new-born infants; a few drops are instilled in each eye at birth. Strengths of 10 to 25 per cent. may be used in infections of the eye and urethra. For irrigation of the urethra or bladder, 1 to 1000 is the usual strength employed.

Protargol is more irritating than *argyrol*. Solutions stronger than 2 per cent. should not be freely used on mucous membranes.

MANGANESE

The compound of manganese most used in medicine is *permanganate of potassium*. This is a purple, crystalline substance, dissolving in water to form a violet colored liquid, which in saturated solution stains the skin yellow. When this solution is brought in contact with organic substances, it yields up its oxygen and becomes colorless.

THERAPEUTIC USES.—This property of yielding up its oxygen makes potassium permanganate of use as an *antiseptic* and *deodorant*. In addition it has *astringent* properties. It is seldom used internally. Its principal uses are:

As an *irrigation* in *gonorrhœa*, beginning with a solution 1 to 6000 and increasing the strength up to 1 to 3000.

In *poisoning* from *alkaloids* such as morphine and strychnine, to wash the stomach with a 1 to 1000 solution in the hope of oxidizing the alkaloid.

In *snake-bite*, a saturated solution is injected in the tissues about the wound.

As a *germicide*, a saturated solution is applied to the hands in the operating room, followed by a saturated solution of oxalic acid. The oxalic acid removes the yellow stain of the permanganate and liberates oxygen in the skin. It is also used in a process for generating formaldehyde gas for the disinfection of rooms after contagious disease, by adding one part of the salt to three of formalin.

SALICYLIC ACID AND THE SALICYLATES

Salicylic acid may be made from the oil of wintergreen or willow leaves, but it is most frequently made from phenol or carbolic acid. All of the official salicylates excepting two, salol and oil of wintergreen, are pinkish-white powders with a sickening sweetish taste. Phenyl salicylate or salol is a grayish-white crystalline powder with a peculiar odor, and is not so soluble as the other salicylates. Salicylic acid is practically insoluble in water, and is a white powder made up of long glistening crystals. The salicylates of ammonia, strontium, and sodium are official. These are all soluble in water, dose 0.5 to 1 Gm. (gr. viii to xv).

Methyl salicylate, the chemical name for oil of wintergreen, dose 0.5 to 1 mil (℥viii to xv); phenyl salicylate or salol, dose 0.5 Gm. (gr. viii). Physostigmine salicylate, given usually by hypodermic injection, has a trade name—*eserine*. It does not possess the characteristic therapeutic properties of the other salicylates. Its dose is 0.001 Gm. (gr. $\frac{1}{50}$).

PHYSIOLOGICAL ACTION.—Salicylic acid and the salicylates are antiseptic and germicidal. They cause a dilatation of the skin vessels and a lowering of the body temperature. They are irritant to the alimentary tract, and have a caustic action on epithelium.

THERAPEUTIC USES. *Antiseptic.*—Salicylic acid and salol are antiseptic. They have been used extensively as intestinal antiseptics in typhoid fever and other conditions.

Antipyretic.—These remedies lower temperature by dilating the skin vessels and causing perspiration.

Caustic.—The softening action of salicylic acid on epithelium is taken advantage of in the many corn salves and corn paints on the market.

Antirheumatic.—The salicylates are almost specific in alleviating the pain and lowering the fever of acute articular rheumatism. In the so-called muscular rheumatism, and in tonsillitis, they are also efficacious, but have little effect on the various affections called chronic rheumatism. A modified salicylic acid known as "aspirin" is much used for its less irritating action on the stomach. The salicylates do not depress the heart in ordinary doses, but they are very irritant to the kidney and to the stomach.

UNTOWARD EFFECTS.—Vomiting may follow the use of salicylic acid or the salicylates, and loss of appetite is not uncommon. Often a peculiar delirium follows the use of these drugs, and a ringing in the ears is not an unusual danger signal. These manifestations should be anticipated and record made of any tendency toward them. Irritation of the kidneys following the use of salol is shown by the dark, smoky urine.

ADMINISTRATION.—Salol is best given in capsule or tablet. The other salicylates are best given in solution on account of their irritant action on the stomach. They should not be given on an empty stomach; preferably after meals.

PHENOL (CARBOLIC ACID)

This acid occurs in colorless needles which are soluble in twenty parts of water. These needles easily become liquid

on the addition of alcohol, water, or glycerin, therefore, most of the acid sold is in a liquid form.

PHYSIOLOGICAL ACTION.—Phenol is caustic to the skin and lessens sensation locally. Taken internally, it paralyzes the brain and acts as a general poison to all the body tissues. Its direct poisonous action on the heart slows that organ. It irritates the kidneys and renders the urine smoky in color. It destroys bacteria very rapidly.

THERAPEUTIC USES. *Sedative.*—In vomiting it is used for its local anæsthetic action 0.06 mils (m̄i) in pill or solution.

Caustic.—In surgery phenol is used to cauterize infected wounds.

Antiseptic.—In surgery it is used as an antiseptic in 2 to 5 per cent. strength. It is not to be used in wet dressings, especially of the extremities, since its use in this way may result in gangrene.

Antipruritic.—The anæsthetic action of phenol makes it of use in itching.

Disinfectant.—For stools in typhoid fever and other diseases, phenol is a much used disinfectant, a solution of 5 per cent. strength being used.

Compound solution of cresol, lysol, creolin, etc., are impure cresol compounds used for the purposes for which carbolic acid is used. Creosote and ichthyol are similar in some respects to the various members of this group.

POISONING.—The odor and characteristic white stains and face are telltale of carbolic acid poisoning. The later effects resemble opium poisoning,—contracted pupils, slow pulse, and failing respiration, followed by rapid pulse, Cheyne-Stokes respiration, and death. The treatment of poisoning consists in washing out the stomach with diluted

alcohol or whiskey, and using supportive measures as in opium poisoning.

URINARY DISINFECTANTS

UROTROPIN (HEXAMETHYLENAMINA, HEXAMINA, HEXAMETHYLENTETRAMINE)

Urotropin, cystogen, hexamethylenamine are various names applied to a substance which is formed when formaldehyde gas is brought in contact with ammonia. This drug occurs as a white powder, soluble in water, with a not disagreeable taste. It has been found to liberate formaldehyde compounds in the urine and prevent the multiplication of bacteria in the urinary tract, in the fluid of the spinal canal, and in the gall-bladder. Barton has proven that it is excreted in a notable amount within a very short time after its administration in discharge from disease of the middle ear. These observations extend the field of this drug's effectiveness.

THERAPEUTICS.—Urotropin is used as a urinary antiseptic and disinfectant in renal colic, pyelitis, cystitis, and infections of the urinary tract from any cause. In suppurative gall-stone disease and meningitis it has also been used; in the former condition large doses being given after operation. Its use in ear diseases will probably cause it to be given in infectious diseases, such as scarlet fever, tonsillitis, measles, etc., to prevent ear involvement, as well as in acute and chronic forms of middle-ear disease. It is given in powder or tablet form, 0.3 to 1 Gm. (gr. v to xv), well diluted, after food. Urotropin renders the urine acid and is not so effective in alkaline urine. Benzoic acid, methylene blue and salol are among the other important urinary disinfectants.

PRACTICAL DISINFECTION *

THE PURPOSE OF DISINFECTION *

1. The purpose of disinfection is to kill the germs which cause any case of contagious disease after they leave the body of the patient before they enter the body of the victim. In practice we either cook such germs to death by boiling, baking, or burning, or poison them by the use of disinfectants, such as carbolic acid.

THE ESSENTIALS OF DISINFECTION

2. Germs can be killed by heat or disinfectants only under the following conditions:

(a) The heat must be sufficiently intense or the disinfectant sufficiently strong.

(b) The germs must be thoroughly exposed to the heat or to the disinfectant.

(c) The germs must remain exposed to the heat or to the disinfectant for a sufficient length of time.

Cooking germs to death we call disinfection by heat. Poisoning germs we call chemical disinfection. Substances used to kill germs by poisoning are called disinfectants or germicides.

"PATENTED" OR "PROPRIETARY" DISINFECTANTS

3. Never try to disinfect with any material whose disinfecting properties have not been vouched for by men qualified by study and experience to express opinion upon the subject and who do not make a profit out of the sale of such material. Disinfectants sold like "patent" medicines are usually both expensive and practically worthless.

* Based on the procedure of District of Columbia Health Department.

SUNLIGHT AS A DISINFECTANT

4. Sunlight kills disease germs and should be admitted freely to the sick-room unless the patient is suffering from some condition which renders darkness necessary.

FRESH AIR AS A DISINFECTANT

5. Proper ventilation diminishes the number of disease germs in the sick room by carrying some such germs into the open air. The number of germs liable to pass from an ordinary well-kept sick-room into the open air by means of ventilation is so small that such germs cannot be regarded as dangerous to people on the outside. Moreover, such organisms speedily die because they are not adapted to live in the open air. The ventilation of a sick-room should not, however, be such as to permit air to pass from the sick-room into the rest of the house.

APPARATUS AND MATERIALS USED IN DISINFECTION

6. Have all utensils and materials necessary for disinfection placed where they can be used with the least possible trouble. Failure to disinfect is often due to the fact that proper facilities for disinfecting are not conveniently at hand.

DISINFECTANTS TO BE PROPERLY LABELED

7. *See that every bottle and box containing a disinfectant is properly labelled and see that all such bottles and boxes are kept apart from bottles and boxes containing medicines for internal use. Accidental poisoning may be thus avoided.*

HEAT AS A DISINFECTANT

8. Heat may be used as a disinfectant in the form of fire, boiling water, or live steam. No special apparatus is needed if fire or boiling water is used. In the first place the articles to be disinfected are simply burned and in the second they

are simply boiled, being weighted if necessary so as to keep them constantly under the surface of the boiling water. Some disease germs are killed by heat more easily than others, but as a safe rule articles to be disinfected by boiling water should be kept under the water while actually boiling for not less than one-half hour. The addition of common washing soda to the water used for this purpose (one moderate tablespoonful of soda to each gallon of water) increases its efficiency.

For instructions as to disinfection of particular articles, see pages 144-151.

Steam disinfection cannot be employed without special apparatus. Rules for operating such apparatus always accompany it and should be strictly complied with.

Heat tends to fix stains. If a stained article is to be disinfected by boiling water or by steam, the stains should be removed by appropriate processes before disinfection.

CARBOLIC ACID

9. Carbolic acid is the most generally useful disinfectant in the sick-room. It is, however, rather expensive when properly used and is objectionable to some persons because of its odor. An aqueous solution of carbolic acid of approximately five per cent. strength solution is made by adding six ounces of pure carbolic acid to one gallon of hot water. This solution can be diluted if weaker strengths are called for.

For instructions as to disinfection of particular articles, see pages 144-151.

Carbolic Acid Burns.—*Pure carbolic acid burns the skin if it comes in contact with it. Should an accident of this kind happen the burn is best treated by the immediate application of ordinary alcohol, or whiskey, brandy, or cologne water.*

Carbolic Acid Poisoning.—*Carbolic acid, either pure or mixed with other substances, is poisonous if taken internally. In case of accidents of this sort, diluted alcohol is the best antidote. This may be given in the form of whiskey, brandy, or cologne water, if the pure alcohol is not at hand. Epsom salts and Glauber's salts, in doses of one tablespoon, rank next to alcohol as antidotes. All cases, however, require the immediate attendance of a physician.*

"BICHLORIDE SOLUTION," SOLUTION OF CORROSIVE SUBLIMATE

10. A standard "bichloride solution," as it is commonly called, contains one part of bichloride of mercury (sometimes known as corrosive sublimate) to each one thousand part of water. Other substances as sal ammoniac and common table salt, are usually added to make the solution keep better and to make it more efficient; others, as blue vitriol, are added to color the solution so as to make it more easily recognized and to prevent accidents.

Bichloride solution can be most conveniently prepared for domestic use by using compressed tablets known as bichloride tablets, which can be purchased at any first-class drug store. The directions for using these tablets accompany the packages in which they are sold. If large quantities of bichloride solution are to be used, it will be found cheaper to have a strong solution prepared by a druggist, and to add at home the water necessary to reduce it to a one-thousandth solution.

For instructions as to disinfection of particular articles, see pages 144-151.

Bichloride solutions corrode metals and tarnish even gold. They lose their disinfecting power in doing so. Such solutions must not be put in metal receptacles. Rings must be removed from the hands which are to be put in bichloride solutions.

Bichloride solutions tend to fix stains. If a stained article is to be disinfected by such a solution, the stains should be removed by appropriate processes before disinfection.

Poisoning by Bichloride Solution.—*Bichloride of mercury, either in its solid form or in mixtures, is poisonous. In cases of poisoning by it give freely white of egg mixed with water, or if this is not at hand give wheat flour mixed with water, or give milk. Send for a physician at once.*

FORMALDEHYDE

II. Formaldehyde is a gas. It is sold in a solution containing forty per cent. of formaldehyde occasionally under the simple designation, "Forty per cent. solution of formaldehyde," and at times under the proprietary designations, "Formalin" and "Formol." For disinfecting, it may be used either in solution or in gaseous form. In household disinfection it is generally used as a gas. If used in liquid form a ten per cent. solution is most generally serviceable, made by adding twelve ounces of the ordinary "formaldehyde," as purchased in the drug store, to one gallon of water.

Formaldehyde tends to fix stains. If a stained article is to be disinfected by formaldehyde, the stains should be removed by appropriate processes before disinfection.

Formaldehyde in gaseous form does not injure even the most delicate fabrics. It has a slightly corrosive action on polished steel, but does not affect other metals.

For domestic use in gaseous form, formaldehyde may be obtained by evaporating the ordinary formaldehyde solution, such as is purchased at the drug store. Formaldehyde will not kill germs unless there is enough of it in the air of the room or closet undergoing disinfection, and the failure of disinfection resulting from the absence of a sufficient quantity of formaldehyde cannot be made good by leaving

the room closed for a longer time. Rapidity of evaporation of the formaldehyde solution is, therefore, essential. The most satisfactory method of liberating formaldehyde gas rapidly is by mixing a forty per cent. solution of formaldehyde with permanganate of potassium. The quantities to be used in a given room are determined by the number of cubic feet of air space contained therein. One pint of formaldehyde solution and one-half pound of permanganate of potassium are sufficient for each 1000 cubic feet of air space. After all openings in the room are closed, place several layers of old newspapers on the floor in the centre of the room, as far removed as possible from all articles of furniture; then place a galvanized iron bucket or other similar receptacle in the centre of the papers which have been spread upon the floor. First place in the receptacle the potassium permanganate, and then pour over it the proper quantity of the formaldehyde solution. A receptacle of ample capacity, not less than that mentioned above, should always be used, as the effervescence resulting from the reaction between the two substances may carry the mixture or some of it over the sides of the receptacle and stain the carpet or floor, if too small a receptacle be used; and the use of newspapers under the receptacle is recommended as an additional precaution against stains, even when receptacles of considerable size are used. As permanganate of potassium is liable to stain anything with which it comes into contact, great care should be exercised in handling it.

The fairly rapid liberation of gas may be secured by sprinkling a forty per cent. formaldehyde solution over sheets hung in the room requiring disinfection and containing the articles to be disinfected. One pint of formaldehyde should be used for every 1000 cubic feet of air space in the apartment, if there is not too much opportunity for the escape

of the gas through cracks, windows, doors, etc. If the gas can find easy escape, proportionately more of the solution must be used. Since either by the permanganate method or by the sheet method formaldehyde gas is rapidly liberated, it is essential that all preparations be made in advance for the operator to leave the room promptly. The door should be closed and sealed and the room left closed for not less than six hours, after which the door and windows may be opened and the room aired.

If the odor of formaldehyde persists so as to be objectionable, it can be removed, or at least moderated, by hanging up towels or sheets in the room and sprinkling them with ammonia water.

When such disinfection is done, as in hospitals, special apparatus is sometimes used for the rapid generation of formaldehyde, either from solutions or from ordinary wood alcohol. Those methods are not available for use by the householder.

For instructions as to disinfection of particular articles, see pages 144-151.

DANGER FROM FORMALDEHYDE

Formaldehyde is intensely irritating to the eyes, nose, and mouth, and kills the upper layers of the skin if applied to it in too strong solutions. The inhalation in ordinary quantities of such formaldehyde as is given off while sprinkling sheets in a room about to be disinfected, is uncomfortable, but not dangerous. The discomfort may be lessened by tying a moist towel over the mouth and nose while engaged in such work. Injury to the hands can be avoided by greasing them well before they come into contact with the formaldehyde solution, or by wearing rubber gloves.

If by chance formaldehyde solution is swallowed, give at once one to two tablespoonfuls of solution of acetate of ammonia (Spirit of mindererus), or one teaspoonful of aromatic spirits of ammonia, diluted with water; or ten to twenty drops of ordinary ammonia, well diluted with cold water. Send for a physician at once. The doses stated are for adults. Doses for children must be in proportion to their age, but none of the antidotes mentioned are poisonous, and they can be given in any approximately correct quantity without fear.

QUESTIONS

1. What two forms of silver preparations are most used in medicine? Which form is used internally? Give its doses. What are the therapeutic uses of the nitrate? What is the antidote for silver nitrate poisoning? Name two albuminates of silver. In what strength are their solutions used and for what purposes?

2. Describe potassium permanganate. On what properties do its therapeutic values depend? What are its principal uses in medicine?

3. Name three salicylates and give their dosage. What is methyl salicylate? phenyl salicylate? How do these drugs act physiologically?

4. What is the principal therapeutic use of the salicylates? Name two other uses in therapeutics. Mention the untoward effects that may follow their uses. What kidney symptoms may occur? Why should salicylates not be given on an empty stomach?

5. What is phenol? Give its physiological action on the skin; the brain; body tissues; heart; kidneys. How does it affect bacteria? What are its therapeutic uses in medicine? in surgery? How is it used as a disinfectant?

6. Give symptoms and treatment of phenol poisoning.

7. How would you disinfect a room 10 x 12 x 15 and its contents after scarlet fever?

8. What is the principal alkaloid of cinchona? How does quinine act on the body-cells? on the malarial parasite? What are its therapeutic uses? How is it given and in what doses? What unusual effects may it produce?

READY REFERENCE TABLES
OF INFORMATION CONCERN-
ING SPECIAL DISINFECTION

PROCEDURE OF THE DISTRICT OF
COLUMBIA HEALTH DEPARTMENT

SPECIAL DISINFECTION

Article to be disinfected	Disinfectant to be used	Form and strength	Minimum duration of exposure *	Remarks
Atomizers	Carbolic acid Formaldehyde Corrosive sublimate			It is safest, after disinfection, to throw the atomizer into the trash receptacle
Bed Linen Use same methods for body linen, table linen, and towels	Boiling water Carbolic acid Corrosive sublimate Formaldehyde	Aqueous solution, 5 per cent. Aqueous solution, 1 to 1,000 Aqueous solution, 10 per cent.	Thirty minutes One hour One hour One hour	As to danger of fixing stains, see sections 8, 10, 11
Bed Pans. (See toilet sets, etc.)				
Blankets	Carbolic acid Corrosive sublimate Formaldehyde Boiling water (for cotton blankets only)	Aqueous solution, 5 per cent. Aqueous solution, 1 to 1,000 Aqueous solution, 10 per cent.	One hour One hour One hour Thirty minutes	As to the danger of fixing stains, see sections 8, 10, 11

* A disinfectant of any kind requires time to act. The minimum duration of exposure is the least time that can elapse after the thing to be disinfected has been first placed in the disinfectant, whether liquid or gas, before the disease-producing germs may safely be regarded as having been killed.

Body Linen Use same method as for bed linen 10 Bolsters Use same methods for pillows and mat- tresses	Formaldehyde Steam	Use as a gas	Six hours	If interior of bolster is probably infected, the bolster should be disinfected by for- maldehyde or steam at the municipal dis- infection station by the Health Depart- ment
	Fire			Books used in sick- room, or used by pa- tient after onset of illness, cannot be dis- infected. They should be destroyed Set books on edge so as to hold leaves apart
Bottles Use same method as for dishes Brushes	Formaldehyde	Use as a gas	Six hours	
	Fire Boiling water Carbolic acid Corrosive sublimate Formaldehyde	Aqueous solution, 5 per cent. Aqueous solution, 1 to 1,000 Aqueous solution, 10 per cent.	Thirty minutes One hour One hour One hour	Tooth brushes should always be destroyed. Hair brushes used in case of scarlet fever should be treated like- wise

SPECIAL DISINFECTION—Continued

Article to be disinfected	Disinfectant to be used	Form and strength	Minimum duration of exposure	Remarks
Carpet	Formaldehyde Formaldehyde	Use as a gas 40 per cent. solution	Six hours	Carpets may be disinfected by going over them with a cloth saturated with 40 per cent. formaldehyde solution. The odor of the gas may, however, persist for days after such disinfection. If probably badly infected, carpets should be taken to the municipal disinfecting station for disinfection
Chinaaware (See dishes and toilet sets)				
Combs, Metal	Boiling water Carbolic acid	Aqueous solution, 5 per cent.	Thirty minutes One hour	
Comforts Use same method as for bolsters, etc.	Boiling water Formaldehyde Formaldehyde	Use as a gas Aqueous solution, 10 per cent.	Thirty minutes Six hours One hour	As to danger of fixing stains, see section 8 10, 11
Curtains, Lace				

Cushions Use same methods as for bolsters, etc.	Carbolic acid	Aqueous solution, 5 per cent.	One hour	
Dishes	Boiling water Formaldehyde	Aqueous solution, 10 per cent.	Thirty minutes One hour	
Dressings	Fire Boiling water Carbolic acid	Aqueous solution, 5 per cent.	Destroy Thirty minutes Two hours	
	Formaldehyde	Aqueous solution, 10 per cent.	Two hours	
Excreta	Carbolic acid	Aqueous solution, 5 per cent.	Two hours	Use an amount of carbolic solution equal to the amount of excreta to be disinfected
Feather Beds Use same methods as for bolsters, etc.				
Fecal matter (see excreta)				
Food (remnants of solid food)	Fire Carbolic acid	Aqueous solution, 5 per cent.	Destroy One hour	Use an amount of carbolic solution equal to the amount of food to be disinfected
Forks	Boiling water Carbolic acid	Aqueous solution, 5 per cent.	Thirty minutes One hour	

SPECIAL DISINFECTION—Continued

Article to be disinfected	Disinfectant to be used	Form and strength	Minimum duration of exposure	Remarks
Forks	Formaldehyde	Aqueous solution, 10 per cent.	One hour	
Furniture	Carbolic acid	Aqueous solution, 5 per cent.		Carbolic acid solution may be used for the woodwork and furniture upholstered in leather; wipe off the furniture with a cloth dampened with a 5 per cent. solution
	Formaldehyde	Use as a gas	Six hours	
Hands	Corrosive sublimate	Aqueous solution, 1 to 1,000		
	Compound solution of creosol	Aqueous solution, 2 per cent.		
Hassocks Use same methods as for carpets Hot Water Bags	Boiling water		Thirty minutes	
	Corrosive sublimate	Aqueous solution, 1 to 1,000	One hour	
	Carbolic acid	Aqueous solution, 5 per cent.	One hour	
	Formaldehyde	Aqueous solution, 10 per cent.	One hour	
	Carbolic acid	Aqueous solution, 5 per cent.	One hour	
Knives	Formaldehyde	Aqueous solution, 10 per cent.	One hour	

Boiling water (for knives wholly of metal)	Thirty minutes	
Matings Use same methods as for carpets Mattresses Use same methods as for bolsters, etc. Pillows Use same methods as for bolsters, etc. Pillow Cases (see bed linen) Portieres	Use as a gas	Six hours
Formaldehyde	If portieres are probably much infected, they should be disinfected by formaldehyde at the municipal disinfecting station by the Health Department	
Privies	Aqueous solution, 5 per cent. Full strength	Two hours
Carbolic acid	Use the carbolic acid solution or milk of lime in an amount equal to the contents of privy box	
Quilts	Milk of lime *	Two hours
Rugs Use same methods as for bolsters Shades Use same methods as for carpets	Use as a gas	Six hours
Formaldehyde		

* Milk of lime.—Slake one quart of finely divided, freshly burned lime in one quart of water. Add three quarts of water and stir the mass thoroughly. Mix fresh daily.

SPECIAL DISINFECTION—Continued

Article to be disinfected	Disinfectant to be used	Form and strength	Minimum duration of exposure	Remarks
Sheets. (See bed linen)				
Shoes	Formaldehyde Corrosive sublimate	Use as a gas Aqueous solution, 1 to 1,000	Six hours	Wash surface with the solution named
Silverware	Boiling water Formaldehyde Carbolic acid	Aqueous solution, 10 per cent. Aqueous solution, 5 per cent.	Thirty minutes One hour One hour	
Spoons Use same methods as for silverware				
Sputum	Carbolic acid	Aqueous solution, 5 per cent.	Two hours	Use an amount of car- bolic solution equal to the amount of sputum to be disinfected
Table Linen Use same methods as for bed linen				
Toilet Sets, etc.	Boiling water Carbolic acid Formaldehyde	Aqueous solution, 5 per cent. Aqueous solution, 10 per cent.	Thirty minutes One hour One hour	
Tooth Brushes. (See brushes)				

Towels
Use same methods as
for bed linen
Toys

Urinals. (See toilet
sets, etc.)
Urine

Walls

Wash Goods
Use same methods as
for bed linen

Wood-work

Woolen Goods

Fire	Aqueous solution, 5 per cent.	Destroy One hour
Carbolic acid	Aqueous solution, 1 to 1,000	One hour
Corrosive sublimate	Aqueous solution, 10 per cent.	One hour
Formaldehyde		
Corrosive sublimate	Aqueous solution, 1 to 1,000	One hour
Carbolic acid	Aqueous solution, 5 per cent.	One hour
Formaldehyde	Aqueous solution, 10 per cent.	
Formaldehyde	Use as a gas	
Corrosive sublimate	Aqueous solution, 1 to 1,000	Six hours
Milk of lime		
Corrosive sublimate	Aqueous solution, 1 to 1,000	
Carbolic acid	Aqueous solution, 5 per cent.	
Formaldehyde	Use as a gas	Six hours

Use an amount of disinfecting solution equal to the amount of urine to be disinfected

Unpapered walls may be washed down with the corrosive sublimate solution, or white-washed with milk of lime

Whether colors are or are not changed depends upon character of fabric

Corrosive sublimate is liable to remove the polish from wood-work. It is suited to painted and plain wood

PART III

REFERENCE LIST OF COMMONLY USED
DRUGS—PHYSIOLOGICAL ACTIONS
AND USES OF DRUGS—POISONS AND
ANTIDOTES—DOSES OF DRUGS—THE
NURSE AND THE HARRISON NARCOTIC
ACT—ANTISEPTIC SOLUTIONS USED IN
MILITARY SURGERY—OTHER FORMULÆ
AND GENERAL REFERENCE MATERIAL.

A REFERENCE LIST OF COMMONLY USED DRUGS, CHEMICALS, PROPRIETARY MEDICINES

THIS list includes official drugs and preparations, and also a number of preparations made by private concerns which have a more or less wide use. In this list, the therapeutic indications of the remedies are given as *recommended* by various writers, and no attempt has been made to reconcile the therapeutic indications with the physiological action of each remedy, as is done in the first portion of this book. The writer does not guarantee the claims made for these preparations: they are given simply for reference. Proprietary preparations have a "P" following the name.

The name in English is first given. Drugs in the U. S. Pharmacopœia or National Formulary have the official Latin title given in brackets. The name as given in the European pharmacopœias comes next in italics, when the U. S. and European medicines are identical. The names of the drugs, chemicals, and proprietary remedies, exclusive of official preparations, which are not followed by a sub-title in italics, have, in most cases, *international usage*.

ACETANILID (Acetanilidum.) *Antifebrinum*.

Phenylacetamide. Antifebrin. White scales of powder; odorless; burning taste. Soluble in about 200 parts of water, 5 of alcohol. Antipyretic; analgesic; antirheumatic; antiseptic. **USES:** *internally*, fever, rheumatism, headache, neuralgia, etc.; *externally*, like iodoform and as a preservative of hypodermic solutions (1:500). **DOSE:** 3-6 gr. (0.2-0.4 Gm.), in powder, alcoholic solution, or hot water cooled down and sweetened to taste; maximum dose, 10 gr. (0.6 Gm.) single; 30 gr. (2 Gm.) daily.

ACID, ACETIC, GLACIAL. (*Acidum Aceticum Glaciale*.)

Caustic (in warts or corns) and vesicant. Not used internally. Antidote: magnesia, chalk, soap and water, lime water, milk, oil, etc.

ACID, ACETIC. (36 per cent.) (U.S.P.) (*Acidum Aceticum*.)

Refrigerant, astringent. Uses: chiefly externally as an inhalant in syncope, asphyxia, and headache, and as application as a rubefacient. Dose: 15-40 minims (1-2.5 mils) well diluted.

ACID, ACETIC. DILUTED. (*Acidum Aceticum Dilutum*.)

Dose: 2-4 fldr. (8-15 mils). (6 per cent.).

ACID, AGARICIC. (*Agaricin*.)

Agaric, or agaricinic acid. Powder; odorless; almost tasteless. Soluble slightly in water; in boiling alcohol and water. Antihydrotic. Uses: night-sweats of phthisis. Dose: $\frac{1}{6}$ - $\frac{1}{2}$ gr. (0.01-0.03 Gm.).

ACID, ARSENOUS. (*Arseni Trioxidum*) White Arsenic.
Acidum Arsenicosum.

White powder or lumps; odorless; tasteless. Soluble in about 100 parts of water; aqueous solubility is increased by tartaric or hydrochloric acid. Antiperiodic; alterative. Uses: *internally*, malarial fever, skin diseases, chorea, neuralgia, gastralgia, diabetes, phthisis; *externally*, to remove warts, cancers, etc. Dose: $\frac{1}{100}$ - $\frac{1}{20}$ gr. (0.001-0.003 Gm.) 4 times daily. Maximum dose: about $\frac{1}{12}$ gr. (0.005 Gm.) single; about $\frac{1}{6}$ gr. (0.001 Gm.) daily. Preparation: solution of 1 per cent.

ACID, BENZOIC. (*Acidum Benzoicum*.)

Pearly plates or needles; aromatic odor; warm acid taste. Soluble in about 2 parts of alcohol and 500 of water. Borax or sodium phosphate increases the solubility in water. Antiseptic, diuretic; expectorant. Uses: *internally*, to acidify phosphatic urine, to reduce acidity of uric acid urine, to control urinary incontinence, also in chronic bronchitis and jaundice; *externally*, wound dressing (1-100), in urticaria, etc. Dose: 10-30 gr. (0.6-2 Gm.) six times daily. Preparation: camphorated tincture of opium.

ACID, BORIC. (*Acidum Boricum.*) *Boracic Acid.*

Soluble in about 18 parts of water, 15 of alcohol. Antiseptic; preservative. *USES:* *internally*, cystitis; tuberculosis; diarrhœa; *externally*, as a dressing for wounds and sores in 5-10 per cent. petrolatum ointment, as insufflation in powder form, in eye lotions, and in nasal and aural washes in 1-4 per cent. aqueous solution, in ringworm, eczema, and other skin diseases. *DOSE:* 5-15 gr. (0.3-1 Gm.). *Preparation:* liquor antisepticus.

ACID, CARBOLIC. (*Phenol.*) *Acidum Carbolicum.*

Soluble in about 15 parts of water; freely in alcohol. Antiseptic; antipyretic; caustic; topical anæsthetic. *USES:* For making disinfecting solutions, aborting boils and carbuncles, as application to ulcers, venereal sores, nævi, hemorrhoids, toothache, diphtheria, etc. *DOSE:* $\frac{1}{2}$ -2 gr. (0.03-0.12 Gm.) well diluted or in pills. Injection into urethra or bladder in solution of 1:2-1000; as wash, 1-3:500; as caustic, pure or concentrated.

ACID, CARBOLIC, LIQUEFIED. (*Phenol Liquefactum.*)*Acidum Carbolicum Liquefactum.*

Contains 87 per cent. phenol. *DOSE:* $\frac{1}{2}$ to 2 mils (0.03-0.12 mils) well diluted. *Preparations:* glycerite (20 per cent.); ointment (5 per cent.).

ACID, CHROMIC. (*Chromii Trioxidum.*)

Small dark purplish red, deliquescent needles or pencils. Soluble freely in water. Astringent; caustic. *USES:* *externally*, in syphilitic ulcers, hyperplasia or ulcers, condylomata, exuberant granulations, hemorrhage, sweating feet, leucorrhœa, etc. Application, as caustic in 20 per cent. solution; for sweating feet, 5 per cent. solution.

ACID, CITRIC. (*Acidum Citricum.*)

Soluble freely in water, alcohol, or glycerin. Antiseptic; antiscorbutic; refrigerant. *USES:* *externally*, pruritus; diphtheria, angina, or gangrenous sore mouth; *internally*, cooling beverage to assuage fever, and as remedy in scurvy.

ACID, GALLIC. (*Acidum Gallicum.*)

Whitish interlaced needles; odorless; astringent; slightly acidulous taste. Soluble in about 100 parts of water and 5 of alcohol. antisudorific; hemostatic; astringent; antiseptic. *USES:* *exter-*

nally, epistaxis, alopecia, purpura, menorrhagia, and hemorrhoids; *internally*, hæmatemesis, hæmaturia, night-sweats, pyrosis, and intestinal hemorrhage. Preferred to tannin in action; does not constipate. Dose: 5-20 gr. (0.3-1.3 Gm.).

ACID, HYDROBROMIC. DILUTED. (Acidum Hydrobromicum Dilutum.)

Nervine. **USES:** in nervous affections; vomiting, whooping-cough, bronchial and nasal catarrhs, cerebral hyperæmia, epilepsy, muscular spasm, hemiplegic chorea, neuralgia, tinnitus, and headache after quinine, etc. Dose: 30-90 minims (2-6 mils) in sweetened water.

ACID, HYDROCHLORIC. (31.9 per cent. HCl.) (Acidum Hydrochloricum.) *Acidum Hydrochloratum.*

Antiseptic, antipyretic; and caustic. **USES:** *internally* in fevers, dyspepsia, syphilis, eczema, psoriasis, etc.; *externally*, in mouth washes and gargles in 1-2 per cent. solution. Dose: 5-10 minims (0.3-0.6 mil) well diluted.

ACID, HYDROCHLORIC. DILUTED. (10 per cent). (Acidum Hydrochloricum Dilutum). Dose: 10-30 minims (0.6-2 mil) well diluted in sweetened water.

ACID, HYDROCYANIC. DILUTED. (2 per cent. HCN.) (Acidum Hydrocyanicum Dilutum.)

Antispasmodic. **USES:** *internally*, to allay pain and spasms, relieve nervous cough; *externally*, to control itching of the skin. Dose: 2-5 minims (0.12-0.3 mil); maximum dose, 10 minims (0.6 mil); *externally*, 1.8-16 as lotion. Only on unbroken skin.

ACID, HYDRIODIC. DILUTED. (Acidum, Hydriodicum Dilutum.)

Brown liquid. Antirheumatic; alterative. **USES:** rheumatism, bronchitis (acute or chronic), asthma, syphilis, obesity, psoriasis, to eliminate mercury or arsenic from the system, etc. Dose: 5-10 minims (0.3-0.6 mil) well diluted with sweetened water, after meals. Preparation: syrup, 4 mils (3i).

ACID, HYPOPHOSPHOROUS. DILUTED. (Acidum Hypophosphorosum Dilutum.) (10 per cent.).

Stimulant and tonic in nervous disease. Dose: 10-60 minims (0.6-4 mils).

ACID, LACTIC. (75 per cent.) (Acidum Lacticum.)

Caustic; astringent; digestive. **USES:** mostly *externally* in carcinoma, croup, etc.; *internally*, dyspepsia, diarrhoea, diabetes, etc. **DOSE:** 15-30 minims (1-2 mils), well diluted. Applied externally, 50-80 per cent. paint.

ACID, NITRIC. (68 per cent. HNO_3 .) (Acidum Nitricum.)

USES: *externally*, as caustic and stimulant in foot baths (30-50 Gm.); also as paint for frost-bites; as an escharotic, applied pure; *internally*, in lepra. Very little used. **DOSE:** 1-5 drops in mixtures well diluted.

✓ **ACID, NITRIC. DILUTED.** (10 per cent. HNO_3 .) (Acidum Nitricum Dilutum.)

Tonic; antiseptic; astringent. **USES:** intestinal indigestion, syphilis, chronic hepatitis. **DOSE:** 5-30 drops (0.3-2 mils) well diluted.

ACID, NITROHYDROCHLORIC. DILUTED. (Acidum Nitrohydrochloricum Dilutum.)

One-fifth strength of concentrated, which is not used therapeutically. **USES:** *internally*, jaundice, biliary calculi, dyspepsia, chronic rheumatism, etc.; *externally*, diluted as sponge or foot bath, two or three times a week. **DOSE:** 5-20 minims (0.03-1.3 mils) well diluted.

ACID, PHOSPHORIC. DILUTED. (10 per cent.) (Acidum Phosphoricum Dilutum.)

Tonic and refrigerant. **USES:** dyspepsia, scrofula, caries, night-sweats of phthisis, disturbances of nutrition of the teeth, etc. **DOSE:** 20-60 minims (1.3-4 mils).

✓ **ACID, PHENYLCINCHONIC.** (Acidum Phenylcinchonicum.)
Atophan.

Phenyl-quinoline-carboxylic-acid. A demobilizer of uric acid. Practically insoluble in water, but soluble in alkaline solutions. Disagreeable taste. **USES:** *internally* in gout. **DOSE:** 0.5 Gm. or 8 grains, usually in tablet.

✓ **ACID, PICRIC.** (Trinitrophenol.)

Picronitric, picrinic, or carbazotic acid. Yellow crystals; odorless; intensely bitter. Slightly soluble in water and alcohol.

Antiseptic; astringent. *USES*: *internally*, in trichiniasis, etc.; *externally*, burns, $\frac{1}{2}$ –1 per cent. hydro-alcoholic solutions for 5 minutes then dressing with cotton (to be renewed only every 7 or 10 days); sore nipples, $\frac{1}{10}$ per cent. solution; eczema, etc. $\frac{1}{3}$ – $\frac{2}{3}$ per cent. solution as paint. *DOSE*: $\frac{1}{2}$ –2 gr. (0.03–0.12 Gm.) in alcoholic solution; maximum daily dose, 5 gr. (0.3 Gm.).
Antidote: albumin.

ACID, PYROGALLIC. (Pyrogallol.)

Pyrogallol. Soluble in about 2 parts of water and 1 of alcohol. Used only *externally*, usually in 5–10 per cent. ointment, in psoriasis and other cutaneous affections.

ACID, SALICYLIC. (Acidum Salicylicum.)

Soluble in about 308 parts of water and $2\frac{1}{2}$ of alcohol; 20 gr. are rendered soluble in 1 ounce of water by the addition of 25 gr. of borax or 40 gr. potassium citrate. Antiseptic; antirheumatic; antipyretic; antineuralgic. *USES*: *internally*, in rheumatism, migraine, neuralgia, and febrile infectious diseases; *externally*, in 2–5 per cent. alcoholic solution or mixed with talcum, for perspiring feet. *DOSE*: 10–40 gr. (0.6–2.6 Gm.).

ACID, SULPHURIC, AROMATIC. (20 per cent. H_2SO_4)

(Acidum Sulphuricum Aromaticum.)

Best form for administration. *USES*: like the diluted acid. *DOSE*: 10–20 minims (0.6–1.3 mls.).

ACID, SULPHURIC. DILUTED. (10 per cent. H_2SO_4)

(Acidum Sulphuricum Dilutum.)

Concentrated sulphuric acid is not used medicinally. *USES*: *internally*, gastro-intestinal disorders, phthisical sweats, exophthalmic goitre, etc.; also as solvent for quinine sulphate, etc. *DOSE*: 15–30 minims (1–2 mls), well diluted.

ACID, TANNIC. (Acidum Tannicum) Tannin. *Acidum Gallo-tannicum*.

Soluble in about 1 part of water or alcohol. Astringent; styptic; antiseptic. *USES*: *externally*, in hemorrhages, applied pure, as enema, in 1–10 per cent. solution in mouth washes, gargles, collyria, injections, inhalations, and as application wherever a powerful astringent action is desired; *internally*, in diarrhœa, renal hemorrhage, and night-sweats. *DOSE*: 2–20 gr. (0.12–1.3 Gm.). Preparations: styptic collodion (20 per cent.); glycerite (20 per cent.); ointment (20 per cent.); troches 1 gr.

ACID, TARTARIC. (Crystals or powder.) (*Acidum Tartaricum.*)

Soluble in about 1 part of water and 3 of alcohol. Refrigerant and antiscorbutic. Dose: 10-30 gr. (0.6-2 Gm.).

ACID, TRICHLORACETIC. (*Acidum Trichloraceticum.*)

Deliquescent crystals; pungent suffocating odor; caustic. Freely soluble in water and alcohol. Escharotic; astringent; hæmodynamic. **USES:** venereal and cutaneous warts, papillomata, vascular nævi, pigmented patches, corns, nasopharyngeal affections, and indolent ulcers. Applied, as escharotic, pure or in concentrated solution; astringent and hæmodynamic, 1-3 per cent. solution. Antidotes; same as for mineral acids.

ACONITE ROOT. (*Aconitum*)—*Aconiti Tuber.*

USES: see Part II. Preparations: extract. Dose: $\frac{1}{4}$ - $\frac{1}{2}$ gr. (0.015-0.03 Gm.), fluidextract, dose $\frac{1}{4}$ -1 minim (0.015-0.06 mil); tincture, 1-3 minims (0.06-0.2 mil).

ADALIN. P.

Sedative and hypnotic. **USES:** in insomnia, especially of aged and insane. Dose: 8-30 gr. (0.5-2 Gm.) in tablet.

ADRENALIN. P. (See Part II.)

Blood-pressure raising principle of suprarenal gland. Hæmodynamic and astringent. **USED** in 1:10,000-10:10,000 solution (as chloride) in hay fever, inflammation of tonsils, larynx, etc., and in conjunctivitis, iritis, etc. Dose: 1 mil (℥xv) by intramuscular injection.

AGAR-AGAR. (*Agar.*)

A substance extracted by means of water and evaporated to dryness from several species of East Indian sea weeds, and occurring in shreds or powder commercially. Is insoluble in cold water but soluble in hot; a solution of 1.5 per cent. on cooling yields a stiff jelly. **USES:** Absorbs water in the stomach and intestines, forming a jelly, and for this reason acts mechanically, bringing water into the lower bowel in constipation, in the treatment of which it is used. Dose: 5 to 15 Gm. (75 to 240 grains) given in substance, mixed with food.

AGURIN. P.

Acet-theobromine sodium. White hygroscopic powder. Soluble in water. Diuretic. **USES:** cardiac and renal diseases. **DOSE:** 8-15 gr. (0.5-1 Gm.) 3 to 4 times a day.

✓ **ALCOHOL.** (92.3 per cent. C_2H_6O .) (Alcohol)—*Spiritus*.

Specific gravity 0.816. Stimulant; irritant. **USES:** *internally* low fevers, debility from acute diseases, aid to digestion, to warm the chilled, and as an antidote to poisoning by carbolic acid; *externally*, hardening the skin, removing desiccated epithelium, antiseptic application in wounds, and application in liniments, etc. **DOSE:** 1-4 fldr. (4-15 mils), with 2-6 times the volume of water. Antidotes: cold douche, stomach siphon, fresh air, ammonia, atropine or belladonna, hot-water bags, ice to the head, irritants, etc.

ALETRIS, CORDIAL. P.

Uterine tonic and diuretic. **DOSE:** 1 fldr. (4 mils) 3 or 4 times daily.

✓ **ALKALITHIA. P.**

Uric acid solvent. **DOSE:** heaping teaspoonful 3 or 4 times daily, in warm water.

ALOES, SOCOTRINE. (Aloe.)

Cathartic; drastic; emmenagogue; vermifuge, stomachic. **USES:** costiveness, atonic dyspepsia, amenorrhœa. **DOSE:** 1-10 gr. (0.06-0.5 Gm.). Preparations: pills, 2 gr. (0.12 Gm.); pills, aloes and asafetida; pills, aloes and iron; pills, aloes and mastic; pills, aloes and myrrh; tincture, dose 15-60 minims (1-4 mils); tincture aloes and myrrh, dose $\frac{1}{2}$ -2 fldr. (2-8 mils); extract dose, 1-5 gr. (0.06-0.3 Gm.).

ALOIN. (Aloin.)

Barbaloin. Soluble in about 60 parts of water and 20 of alcohol. **ACTION AND USES:** like socotrine aloes. **DOSE:** $\frac{1}{2}$ -2 gr. (0.03-0.12 Gm.); maximum dose, 4 gr. (0.25 Gm.), single; 10 gr. (0.6 Gm.), daily. Injection $\frac{3}{4}$ gr. (0.045 Gm.) dissolved in formalide.

✓ **ALPYN. P.**

An artificial alkaloid similar in action to cocaine but less toxic. Used in the same manner as novocaine. (See p. 192.).

AMMONIA WATER. (10 per cent. NH_3 .) (Aqua Ammoniaë.)
Liquor Ammonii Caustici.

Rubefacient; stimulant. *USES:* *internally*, stimulant in collapse and fainting; *externally*, by inhalation in fainting, in combination with carbolic acid in coryza, as an antidote in poisoning with chlorine gas; as application in form of wash and compresses in stings of poisonous insects; in rheumatic pains and neuralgias, in form of liniment (1:10-5:10 per cent. of lanum, oil or fat). *DOSE:* 10-30 minims (0.6-2 mls). Preparations: liniment (3 per cent. NH_3); aromatic spirits 1-2 fldr. (4-8 mls).

AMMONIA WATER, STRONGER. (28 per cent. NH_3 .) (Aqua Ammoniaë Fortior.)

DOSE: 4-10 minims (0.25-0.6 ml) well diluted. Antidotes: vinegar; vapor of acetic or chlorine water by inhalation. Preparations: spirit, 10-30 minims (0.6-2 mls).

AMMONIUM BENZOATE. (Ammonii Benzoas.)

Soluble in about 6 parts of water and 28 of alcohol. Expectorant; antiseptic; antipyretic; diuretic. *USES:* in bronchitis, asthma, gastro-intestinal disturbances, rheumatism, gout, and nephritis. *DOSE:* 10-30 gr. (0.6-2 Gm.) 3 or 4 times daily in syrup or water.

AMMONIUM BROMIDE. (Ammonii Bromidum.) *Ammonium Bromatum.*

Soluble in about 2 parts of water, 30 of alcohol. Sedative. *USES:* epilepsy, delirium tremens, nervous headache, etc. *DOSE:* 15-30 gr. (1-2 Gm.).

AMMONIUM CARBONATE. (Ammonium Carbonas.) *Ammonium Carbonicum.*

Soluble in about 5 parts of water, 200 of alcohol. Rubefacient; cardiac stimulant; expectorant. *USES:* *internally*, in syncope, heart failure, pneumonia, phthisis, and hysteria; *externally*, by inhalation in fainting. *DOSE:* 5-20 gr. (0.3-1.3 Gm.). Preparations; Spts. Ammon. Aromat.

AMMONIUM CHLORIDE. (Ammonii Chloridum.) *Ammonium Chloratum.*

Slightly soluble in alcohol, in about 3 parts of water. Stimulant; expectorant. *USES:* bronchial affections, hepatic congestions, muscular rheumatism. *DOSE:* 5-20 gr. (0.3-1.3 Gm.).

AMMONIUM IODIDE. (Ammonii Iodidum.) *Ammonium Iodatum.*

Deliquescent, unstable powder. Soluble in about 1 part of water, 9 of alcohol. Alterative; resolvent. **USES:** syphilis, scrofula, rheumatism, and phthisis; *externally*, in lepra and psoriasis. **DOSE:** 3-10 gr. (0.2-0.6 Gm.).

AMMONOL. P.

Analgesic. **DOSE:** 5-20 gr. (0.3-1.3 Gm.) 3-6 times daily.

AMYL NITRITE. (Amylis Nitris.) *Amylium Nitrosum.*

Very volatile unstable liquid. Insoluble in water; soluble in alcohol. Antispasmodic; vasodilator. **USES:** angina pectoris, asthma, tetanus, epilepsy, syncope, dyspnoea, and as an antidote to poisoning by cocaine. **DOSE:** 2-5 drops. Used mostly by inhalation.

ANÆSTHESIN. P.

A local anæsthetic similar in its origin and action to Orthoform but slightly more soluble. Used internally in gastric ulcer in doses of 0.3 to 0.5 Gm. (gr. v to gr. viii).

ANALGINE. P.

Analgesic; antipyretic; nerve sedative. **USES:** neuralgia, migraine, headache, grip, rheumatism. **DOSE:** 5-10 gr.

ANTIFEBRIN. P.—See Acetanilid.**ANTIMONY AND POTASSIUM TARTRATE.** (Antimonii et Potassii Tartras.) *Tartarus Stibiatus.*

Tartar emetic. Insoluble in alcohol, soluble in about 17 parts of water. Emetic; expectorant; diaphoretic. **USES:** bronchial catarrh, pneumonia, pulmonary emphysema. **DOSE:** alterative, $\frac{1}{30}$ - $\frac{1}{15}$ gr. (0.002-0.004 Gm.); diaphoretic and expectorant, $\frac{1}{36}$ - $\frac{1}{8}$ gr. (0.0025-0.008 Gm.); emetic, $\frac{1}{2}$ gr. (0.03 Gm.) every 20 minutes. Preparations: Compound Licorice Mixture; Compound Syrup of Squills.

ANTIPYRIN. (Antipyrina.) *Pyrazolonum Phenylldimethylicum.*

Dimethyloxyquinizine. Soluble in about 1 part of water, 2 of alcohol. Antipyretic; analgesic; sedative; styptic; antiseptic. **USES:** Rheumatism, cephalalgia, lumbago, sciatica, infantile con-

vulsions, nervous urticaria, chorea, whooping-cough, epilepsy, influenza, etc. Dose: 10-20 gr. (0.6-1.2 Gm.), per enema in double the dose; *subcutaneously*, (1:1) in water, 15-30 minims (1-2 mls) in neuralgia, myalgia and renal and biliary colic; in hemorrhoids 2:15 ointment. Applied as styptic in 20 per cent. solution or pure.

ANTITOXIN, DIPHTHERIA. (Serum Antidiphthericum.)

From serum of blood of a horse that has been subjected to the toxin of diphtheria. Limpid liquid that has generally been preserved in $\frac{1}{2}$ per cent. carbolic acid or other preservative. Dose: prophylactic, 1000 antitoxic units; ordinary cases, 5000-10,000 units; severe cases (or those seen late, or of nasal or laryngeal type), 10,000-20,000 units; given hypodermically and repeated in about 12-24 hours. As much as 30,000 units have been injected at a dose.

ANTITOXIN, DIPHTHERIA, CONCENTRATED. (Serum Antidiphthericum Purificatum.)

A solution in physiologic salt solution of immunizing proteins for diphtheria. DOSAGE AND USE: same as diphtheria antitoxin.

ANTITOXIN, DIPHTHERIA, DRIED. (Serum Antidiphthericum Siccum.)

A dried preparation of diphtheria antitoxin.

APIOL. P.

Greenish, oily liquid. Soluble in alcohol and ether. Emmenagogue; antiperiodic. Uses: dysmenorrhœa, malaria. Dose: 5-10 minims (0.3-0.6 Gm.) 2 or 3 times daily, in capsules; in malaria 15-30 minims (1-2 mls).

APIOLINE. P.

Emmenagogue. Dose: 2-3 capsules.

APOMORPHINE HYDROCHLORIDE. (Apomorphinæ Hydrochloridum.) *Apomorphinum Hydrochloridum.*

Soluble in about 50 parts of water and 50 of alcohol. Hypnotic; emetic; expectorant. Dose: expectorant $\frac{1}{60}$ - $\frac{1}{20}$ gr. (0.001-0.003 Gm.); emetic, $\frac{1}{15}$ - $\frac{1}{8}$ gr. (0.004-0.008 Gm.). Injected, emetic, $\frac{1}{20}$ - $\frac{1}{10}$ gr. (0.003-0.006 Gm.); hypnotic, $\frac{1}{60}$ - $\frac{1}{20}$ gr. (0.0015-0.002 Gm.).

ARGONIN. P.

Silver casein compound; 4.25 per cent. silver. White powder. Soluble in hot water; ammonia increases solubility. Antiseptic. **USES:** Chiefly in gonorrhœa, in 1-2 per cent. solution; also in blenorrhœa neonatorum, in 3 per cent. solution.

ARGYROL. P.

Silver vitellin. Antiseptic. **USES:** like silver nitrate in diseases of the eye, throat, nose, ear, and genito-urinary organs. Application, as irrigation in endometritis, gonorrhœa, etc., in 1:1000-4:1000 solution; as injection in gonorrhœa, in 3-5 per cent. solution.

ARISTOL. (Thymolis Iodidum.) *Aristolium.*

Dithymol diiodide; annidalin; thymotol. Reddish brown, tasteless powder, about 46 per cent. iodine. Insoluble in water, sparingly so in alcohol. Succedaneum for iodoform externally. Applied like the latter in 10 per cent. solution, ointment, suppository, etc.

ARSENAURO. P.

Alterative tonic. **DOSE:** 5-15 minims (0.3-1 mls), in water after meals.

ASAFETIDA. (Asafœtida) Gum Asafetida. *Asa Fœtida.*

Expectorant; stimulant; antispasmodic; emmenagogue; anthelmintic. **USES:** hysteria, convulsions, spasms, asthma, whooping cough, catarrhs, etc. **DOSE:** 5-15 gr. (0.3-1 Gm.). **Preparations:** emulsion, 2-6 fldr. (8-24 c.c.); pills, 3 gr. (0.2 Gm.); tincture, 20-60 minims (1.3-4 mls).

ASPIRIN. P.

Acetylsalicylic acid. White needles. Soluble in 100 parts of water. Antipyretic; antirheumatic. **USES AND DOSES:** Same as sodium salicylate; best taken in capsules. Incompatible with alkalies.

ATOXYL. P.

Arsenic-acid anilid. White, crystalline, odorless powder. Soluble in water. **USES:** like all arsenicals. **DOSE:** 34-3 gr. (0.045-0.18 Gm.), per day subcutaneously.

• **ATROPINE.** (Atropina.)

White crystals. Soluble freely in alcohol and slightly in water. Antispasmodic; analgesic; mydriatic; respiratory and cardiac stimulant; antisialagogue; antihydrotic. *USES:* *internally*, antidote to pilocarpine, chloral, chloroform, hydrocyanic acid, fungus poison, and morphine; angina pectoris, shock, colliquative sweats, gastric ulcer, etc.; *externally*, ointment (1 per cent. or oleate as analgesic; mydriatic, $\frac{1}{2}$ per cent. solution). *DOSE:* $\frac{1}{120}$ – $\frac{1}{60}$ gr. (0.0005–0.001 Gm.); maximum dose, $\frac{1}{60}$ gr. (0.001 Gm.) single; and $\frac{1}{30}$ gr. (0.003 Gm.) per day.

• **ATROPINE SULPHATE.** (Atropinæ Sulphas.)

Soluble in $\frac{1}{2}$ part of water, 6 parts alcohol. *USES AND DOSE:* Same as of atropine.

BACILLUS, BULGARIAN.—See Bulgarian Bacillus.

✓ **BALSAM PERU.** (Balsamum Peruvianum.)

Dark, molasses-like liquid; aromatic odor. Insoluble in water, soluble in absolute alcohol. Expectorant; stimulant; stomachic; antiseptic. *USES:* *internally*, chronic catarrh, gonorrhœa, leucorrhœa, etc.; *externally*, tuberculous affections of bone, skin, etc., chronic indolent ulcers, scabies, sore nipples, lice, chilblains, etc. *DOSE:* 15 gr. (1 Gm.).

BELLADONNA LEAVES. (Belladonnæ Folia.)

Preparations: extract, 0.01 Gm. (gr. $\frac{1}{6}$); tincture (10 per cent.) 0.5 mil (gr. viii); ointment, 10 per cent.; plaster 30 per cent.

BELLADONNA ROOT. (Belladonnæ Radix.)

Preparations: extract 0.01 Gm. (gr. $\frac{1}{6}$); tincture (10 per cent.) of fluidextract, 5 per cent. camphor.

• **BENZOIN.** (Benzoinum.) *Benzoe.*

Preparations: tincture (20 per cent.) 1 mil (15 minims); compound tincture (10 per cent.) 2 mils (℥ xxx); benzoinated lard.

• **BISMUTH BETA-NAPHTHOLATE.** (Bismuthi Betanaphtholas.)

Orphol. Grayish-yellow powder becoming darker in time. Insoluble in water, slightly so in alcohol. 76–77 per cent. BiO. Intestinal antiseptic like salol. *DOSE:* 0.3–1 Gm. (5–15 gr.) 3–5 times daily, in tablet or powder; children, 0.12–0.3 Gm. (2–5 gr.).

BISMUTH, FORMIC IODID. P.

Mixture of formaldehyde, gelatin, thymol iodide, and bismuth suboxide. Surgical antiseptic; astringent; alterative, analgesic: **USES:** as a stimulant dry dressing to wounds, ulcerations, and skin diseases.

BISMUTH SALICYLATE. (Bismuthi Subsali-cylas.) *Bismuthum Subsali-cylicum.*

White, odorless, tasteless powder. Insoluble in water or alcohol. External and internal intestinal antiseptic and astringent. **USES:** *internally*, phthisical diarrhoea, summer complaint, typhoid fever, etc.; *externally*, like iodoform. **DOSE:** 0.3-1 Gm. (5-15 gr.).

BISMUTH SUBCARBONATE. (Bismuthi Subcarbonas.)

White, insoluble powder. Stomachic astringent. **USES:** *internally*, diarrhoea, vomiting, and disordered condition of the alimentary canal; *externally*, face powder, etc. **DOSE:** 0.5 Gm. (gr. viii).

BISMUTH SUBGALLATE. (Bismuthi Subgallas.) *Subgallas Bismuthicus.*

Dermatol. Odorless yellow powder. Insoluble in water or alcohol. Siccative antiseptic, and substitute for bismuth subnitrite internally. **USES:** *externally*, on wounds, ulcers, eczemas, etc.; *internally*, in gastro-intestinal affections. **DOSE:** 0.25 Gm. (gr. iv) several times daily. Incompatible with acids.

BISMUTH SUBNITRATE. (Bismuthi Subnitras.) *Bismuthum Subnitricum.*

White, heavy, insoluble powder. Insoluble in water. Antiseptic; astringent. **USES:** *internally*, in acute gastric affections, intestinal catarrh, dysentery, round gastric ulcer, etc.; *externally*, in eczema, ulcers, and fissures as dusting powder; in gonorrhoea in aqueous suspension as injection. **DOSE:** 0.5 Gm. (gr. viii).

BISMUTH AND AMMONIUM CITRATE. (Bismuthi et Ammonii Citras.)

Soluble in water, slightly in alcohol. Stomachic and astringent. **USES:** in dyspepsia, gastric disturbances, and diarrhoea; *externally* as urethral wash in gonorrhoea in 1:2000-500 solution. **DOSE:** 0.12-0.3 Gm. (gr. ii-v).

BLACK HAW. (*Viburnum Prunifolium.*) *Cortex Viburnum.*

Viburnum prunifoliorum. Nervine; oxytotic; astringent. Preparation: fluidextract, 2 mls (℥ xxx).

BOROLYPTOL. P.

Antiseptic. Dose: 2-4 mls ($\frac{1}{2}$ -1 fldr.), diluted; *externally*, in 5-50 per cent. solution.

BORNYVAL. P. (Bornyval Isovalerate.)

A derivative of the oil of valerian, used in hysteria and nervous disorders. It is given in capsule, 0.25-0.75 c.c. (℥iv-xii).

BROMIDIA. P.

Hypnotic; sedative. Dose: 4-8 mls (1-2 fldr.).

BROMINE. (*Bromum.*)

Soluble in alcohol, and in about 30 parts of water. Antiseptic; disinfectant. Uses: *externally*, caustic, pure or in 1.5-10 per cent. solution; by inhalation, as spray, in form of mixture of bromide solution and potassium bromide each 0.2 parts, with water 100 parts, in diphtheria and croup; *internally*, rarely in diphtheria in dose of $\frac{1}{12}$ - $\frac{1}{8}$ minims (0.005-0.02 mil) several times a day. Dose: 0.06-0.02 Gm. (℥i-iii) well diluted.

BROMOFORM. (*Bromoformum.*)

Heavy liquid, odor and taste similar to chloroform; darkens on exposure. Soluble in alcohol, insoluble in water. Antispasmodic; sedative. Uses: chiefly in whooping-cough Dose: 0.2 mil (℥iii).

BROMURAL. P. (Monobrom-isovaleryl urea.)

A urea compound of bromine with an action similar to veronal. Given in tablet or powder 0.3 to 0.6 Gms. (5 to 10 gr.) at bedtime.

BROVALOL. P.

A valerianic compound of bromine, used in nervous excitement and hysteria. Dose: 0.25-0.75 Gm. (grs. iv-xii).

BUCHU. (*Buchu.*)

Stimulant; tonic, diuretic; diaphoretic. Uses: diseases of kidney, bladder, urethra, etc. Preparation: fluidextract, 2 mls (℥ xxx).

BULGARIAN BACILLUS.

Bulgara, bacillus Bulgaricus, etc. A lactic-acid producing bacillus, which ferments milk and sugar solution. Used in auto-intoxication of intestinal origin and to produce so-called "Bulgarian" buttermilk when added to milk and incubated. Sold in tablets and vials of pure bouillon culture.

CAFFEINE. (*Caffeina.*) *Caffeinum.*

Theine, Guanine. White needles, bitter taste. Soluble in about 80 parts of water, solubility is increased by addition of sodium benzoate or salicylate. Diuretic; cardiac and cerebral stimulant; muscle invigorator. **USES:** nervous headache, neuralgia, heart failure, cardiac dropsy, nephritis, collapse, senile pneumonia, enteritis, etc. **DOSE:** 0.065 Gm. (gr. i); maximum; 0.6 Gm. (gr. x) single; 2 Gm. (gr. xxx) daily.

CAFFEINE, CITRATED. (*Caffeina Citrata.*) *Caffeinum Citricum.*

Improperly called "citrate of caffeine"; 50 per cent. caffeine. White powder with an acid taste. Soluble in about 25 parts of water. **USES:** as in caffeine. **DOSE:** 0.125 Gm. (gr. ii).

CAFFEINE AND SODIUM BENZOATE. (*Caffeinae Sodii Benzoas.*)

45.8 per cent. caffeine. White powder. Soluble in about 2 parts of water. **USES:** by injection, 2-10 gr. (0.12-0.6 Gm.).

CALCIUM BROMIDE. (*Calcii Bromidum.*)

White granules, very deliquescent; sharp, saline taste. Freely soluble in water and alcohol. Nerve sedative like potassium bromide. **USES:** epilepsy, hysteria, etc. **DOSE:** 1 Gm. (gr. xv).

CALCIUM CARBONATE, PRECIPITATED. (*Calcii Carbonas Præcipitatus.*) *Calcium Carbonicum Præcipitatum.*

Precipitated chalk. Antacid. **USES:** diarrhoea and acid conditions of intestine and stomach. **DOSE:** 1 Gm. (gr. xv).

CALCIUM CARBONATE, PREPARED. (*Creta Præparata.*)
Prepared Chalk.

Drop chalk. **USES AND DOSE:** as precipitated chalk. **Preparations:** compound powder, 0.6-2 Gm (gr. x-xxx); mercury

with chalk, 0.2-0.6 Gm. (gr. iii-x); chalk mixture, 4-16 mils (1-4 fldr.).

CALCIUM LACTATE. (*Calcii Lactas.*)

Lactate of Lime. Metabolic adjuvant. Coagulant. **USES:** internally in rickets, hemophilia, tetany. **DOSE:** 0.5 Gm. (grs. viii).

CALCIUM CHLORIDE. (*Calcii Chloridum.*)

Colorless, deliquescent crystals. Soluble in about 2 parts of water, 8 of alcohol. Internally in large doses, 1.2-2.3 Gm. (gr. xviii-xxxv), 3 times a day in chronic itching; also internally and externally in hemorrhages. **DOSE:** 0.5 Gm. (gr. viii) 3 times daily in solution, in rhachitis and arthritis.

CALUMBA. (*Calumba.*) *Radix Columbo.*

Columbo. Bitter tonic. **USES:** dyspepsia, debility, flatulence. **DOSE:** 2 Gm. (dr. ss). Preparations: fluidextract, 2 mils (fldr. ss); tincture (20 per cent.), 4 mils (fldr. i).

CAMPHOR. (*Camphora.*)

Soluble in about 1 part of alcohol; insoluble in water. Stimulant; diaphoretic; sedative; carminative; expectorant; antiseptic; analgesic; antipruritic. **USES:** nervous diarrhœa, flatulence, colic, headache, chorea, cramps, asthma, collapse, spasmodic cough, etc. **DOSE:** 0.125 Gm. (gr. ii); maximum dose, 1.3 Gm. (gr. xx). Preparations: cerate (1:50); liniment, (1:5); spirits, 1 mil (℥ xv); water, as vehicle.

CAMPHOR, MONOBROMATED. (*Camphora Monobromata.*)

Soluble in alcohol, almost insoluble in water. Soporific; anti-neuralgic; antispasmodic. **USES:** delirium tremens, hysteria, insomnia, whooping-cough, epilepsy, neuralgia, chorea, etc. **DOSE:** 0.125 Gm. (gr. ii), in pill or emulsion; injection, 1½ gr. (0.1 Gm. in oil.)

CANNABIS INDICA. (*Cannabis.*)

Indian hemp. Narcotic; sedative; analgesic; aphrodisiac. **USES:** headache, summer diarrhœa, anorexia, chorea, hysteria, mental depression, delirium tremens, etc. Preparations: extract, 0.01 Gm. (gr. ⅙); fluidextract, 0.05 Gm. (℥ i); tincture (10 per cent.), 1 mil (℥ xv).

CANTHARIDES. (Cantharis.) Spanish Flies.

Irritant; vesicant; diuretic; aphrodisiac; rubefacient. **USES:** *internally*, lupus, tuberculosis; *externally*, neuralgia (as vesicant), and for promoting growth of hair. **DOSE:** 0.03 Gm. (gr. $\frac{1}{2}$). **Preparations:** cerate (32 per cent.); collodion; tincture (10 per cent.), 0.3 mil (℥ v).

CAPSICUM. (Capsicum.) *Fructus Capsici*.

Cayenne pepper; African pepper. Rubefacient; stimulant; carminative. **USES:** *internally*, diarrhœa, dyspepsia, colic, alcoholism, etc.; *externally*, rheumatism, neuralgia, lumbago, etc. **DOSE:** 0.065 Gm. (gr. i). **Preparations:** oleoresin, 0.03 Gm. (gr. $\frac{1}{2}$); fluidextract, 0.05 mil (℥ i); tincture, (10 per cent.) 0.5 mil (℥ viii); plaster.

CARDAMON. Cardamonii Semen.) *Fructus Cardamonii*.

Carminative; aromatic tonic. **DOSE:** 1 Gm. (gr. xv). **Preparations:** tincture (20 per cent.), 4 mils (fldr. i); compound tincture (2.5 per cent.), 4 mils (fldr. i).

CASCARA SAGRADA. (Cascara Sagrada.) *Cortex Rhamni Purshiana*.

Laxative; cathartic; hepatic; intestinal tonic. **USES:** chronic constipation, rheumatism. **Preparations:** extract, 0.25 Gm.; (gr. iv); fluidextract, 1 mil (℥ xv); aromatic fluidextract, 1 mil (℥ xv).

CATECHU. (Gambir.)

Astringent; hæmostatic. **USES:** diarrhœa, leucorrhœa, gonorrhœa, gleet, hemorrhage, relaxed uvula, spongy gums, etc. **DOSE:** 1 Gm. (gr. xv). **Preparations:** compound tincture (5 per cent.), 4 mils (fldr. i); troches (0.06 Gm. each).

CERIUM OXALATE. (Cerii Oxalas.)

White powder, odorless and tasteless. Insoluble in water and alcohol. Sedative. **USES:** vomiting of pregnancy, sea-sickness, gastric crises in tabes, migraine, chronic diarrhœa. **DOSE:** 0.065 Gm. (gr. i), maximum dose 0.3 Gm. (gr. v), single; 1 Gm. (gr. xv) daily.

CHALK.—See Calcium Carbonate.

CHALK MIXTURE. (*Mistura Cretæ.*)

Chalk suspended in cinnamon water. Given as an antacid.

Dose: 15 to 30 c.c. (℥ss to ℥i).

CHARCOAL.—(*Carbo Ligni.*) *Carbo Ligni Pulveratus.*

Wood charcoal. Uses: dyspepsia, flatulence, etc. Dose: 1 Gm. (gr. xv). Incompatible with chlorates, permanganates, and other oxidizers.

CHLORAL HYDRATE. (*Chloralum Hydratum.*)

Soluble in about 1 part of water. Hypnotic; antispasmodic; analgesic; antiseptic. Uses: *internally*, insomnia, puerperal eclampsia, mania, delirium tremens, convulsions, chorea, tetanus. Dose: 1 Gm. (gr. xv), in sweetened solution, well diluted; in nervous dyspepsia, 0.12–0.3 Gm. (gr. ii–v) after meals; maximum dose, 5 Gm. (dr. 1¼) per day. Contra-indicated in gastritis; large doses must not be given in heart disease; in children and the aged, use with caution.

CHLORETONE. P.

Acetone-chloroform. White crystals of camphoraceous odor and taste. Soluble in 100 parts of water, 7 of glycerin. Local anæsthetic, hypnotic, antiseptic. Uses: painful wounds, burns, etc.; insomnia in the aged, etc. Dose: 0.3–1 Gm. (gr. v–xv); *externally*, in saturated aqueous solution, 10 per cent. ointment, or dusting powder.

CHLOROFORM. (*Chloroformum.*) *Chloroformium.*

Soluble in all proportions of alcohol or ether, in about 200 parts of water. Antiseptic; anæsthetic; analgesic. Uses: *internally*, in colic, asthma, cramps, cough, hiccough, tic douloureux, etc.; by *inhalation*, as an anæsthetic in surgery; *externally*, as a liniment for rheumatism, colic, neuralgia, etc. Dose: 0.3 mil (℥ v), preferably as the spirit; maximum dose, 1.3 mils (gr. xx). Preparations: water, 16 mils (fldr. iv); spirit, 2 mils (℥ xxx); emulsion, 8 mils (fldr. ii); liniment.

CHRYSAROBIN. (*Chrysarobinum.*)

So-called chrysophanic acid; purified goa powder. Yellow powder. Soluble in boiling alcohol. Antiparasitic; alterative. Uses: Psoriasis, herpes tonsurans, pityriasis versicolor, hemorrhoids. Dose: 0.03 Gm. (gr. ½). Preparation; ointment (6 per cent.).

CIMICIFUGA. (*Cimicifuga*.)

Black snakeroot; black cohosh. Sedative; alterative; analgesic; emmenagogue. **USES:** chorea, heart disease (where digitalis is contra-indicated), rheumatism, myalgia, hysteria, dysmenorrhœa, amenorrhœa. **DOSE:** 1 Gm. (gr. xv). Preparations: extract, 0.25 Gm. (gr. iv); fluidextract, 1 mil (℥ xv); tincture (20 per cent.), 4 mils (fldr. i).

CINCHONA. (*Cinchona*.) *Cortex Chinæ.*

Antiperiodic, bitter tonic. **USES:** malaria, anorexia, debility, etc. **DOSE:** 1 Gm. (gr. xv). Preparations: fluidextract, 1 mil (℥ xv); tincture (20 per cent.), 4 mils (fldr. i.).

CINCHONIDINE.

White crystals. Soluble in dilute acids, insoluble in water. Antiperiodic, and bitter tonic like quinine. **USES:** malaria, anorexia. **DOSE:** 0.25 Gm. (gr. iv) in pills or syrup.

COCAINE HYDROCHLORATE. (*Cocainæ Hydrochloridum*.)*Cocainum Hydrochloridum.*

Soluble in about $\frac{1}{2}$ part of water, $3\frac{1}{2}$ parts of alcohol. Local and general anæsthetic; stimulant; antipruritic; mydriatic. **USES:** local anæsthetic on all mucous membranes, toothache, catarrh, whooping-cough, tonsillitis, vomiting, ringing in the ears, etc. **DOSE:** 0.03 Gm. (gr. $\frac{1}{2}$); best given in powder; maximum dose, 0.12 Gm. (gr. ii), single; 0.36 Gm. (gr. vi), daily.

CODEINE. (*Codeina*.) *Codeinum.*

Methylmorphine. Soluble in about 120 parts of water. Hypnotic; analgesic; sedative. **USES:** instead of morphine but not in severe pain; particularly in bronchitis, irritating coughs, diabetes mellitus, diseases of the respiratory organs, and in cure of morphine habit. **DOSE:** 0.03 Gm. (gr. $\frac{1}{2}$); maximum dose, 0.1 Gm. (gr. $1\frac{1}{2}$), single; 0.3 Gm. (gr. v), daily.

COLCHICINE. (*Colchicina*.)

Yellow crystals or amorphous powder; very bitter taste. Soluble in water or alcohol. **USES:** rheumatism, gout, asthma, cerebral congestion. **DOSE:** 0.0005 Gm. (gr. $\frac{1}{120}$), 2 or 3 times daily; maximum dose, 0.002 Gm. (gr. $\frac{1}{30}$), single; 0.005 Gm. (gr. $\frac{1}{12}$), daily.

COLCHICUM ROOT. (Colchici Cormus.)

Alterative; sedative; diuretic; expectorant. **USES:** rheumatism, gout, dropsy, asthma, and ascites from hepatic obstruction. **DOSE:** 0.25 Gm. (gr. iv).

COLCHICUM SEED. (Colchici Semen.) *Semen Colchici.*

Action, uses, and dose like those of the root. **Preparations:** fluidextract, 0.2 c.c. (℥ iii); tincture (10 per cent.), 2 mils (℥ xxx); wine, 2 mils (℥ xxx).

COLCHI-SAL. P.

Antirheumatic; antipodagric. **DOSE:** 2-4 capsules with meals and at bedtime.

COLLARGOL. P.

Argentum Credé; colloidal silver. Soluble metallic silver. Antiseptic. **USES:** sepsis, lymphangitis, cellulitis, etc. **DOSE:** 0.01-0.02 Gm. (gr. $\frac{1}{6}$ - $\frac{1}{3}$) 2 or 3 times daily; *externally*, mostly in 15 per cent. ointment ("Unguentum Credé), 12 Gm. (dr. iii) of this by inunction; also in 1:1000-1:5000 lotion.

COLLODION, CANTHARIDAL. (Collodium Cantharidatum.)

Collodium Vesicans.

Blistering or vesicating collodion. Olive-green, syrupy liquid. Represents 60 per cent. cantharides. **USES:** as blister instead of cantharides.

COLLODION, STYPTIC. (Collodium Stypticum.)

20 per cent. tannic acid. **USES:** bleeding wounds.

COLOCYNTH. (Colocynthis.) *Fructus Colocynthis.*

Drastic cathartic; diuretic. **USES:** obstinate constipation and dropsical conditions. **DOSE:** 0.065 Gm. (gr. i). **Preparations:** extract, 0.03 Gm. (gr. $\frac{1}{2}$); compound extract, 0.5 Gm. (gr. viii); compound cathartic pill, 2 pills; vegetable cathartic pill, 2 pills.

CONIUM. (Conium.)

Hemlock. Antispasmodic; sedative; anodyne. **USES:** *internally*, maniacal excitement, whooping-cough, chorea; *externally*, neuralgia, rectal diseases, pruritus. **DOSE:** 0.2 Gm. (gr. iii). **Preparation:** fluidextract, 0.2 mil (℥ iii).

COPAIBA. (Copaiba.) *Balsamum Copaibæ.*

Balsam, copaiba or copaiva. Soluble in ether. Stimulant; expectorant; diuretic; laxative. **USES:** *externally*, locally in indolent ulcers and chilblains; *internally*, gonorrhœa, cystitis, leucorrhœa, etc. **DOSE:** 1 mil (℥ xv). Preparation: oil, 0.5 mil (℥ viii).

COPPER SULPHATE. (Cupri Sulphas.) *Cuprum Sulphuricum.*

Soluble in about 3 parts of water, insoluble in alcohol. Escharotic; styptic; astringent; emetic; alterative; nervine. **USES:** *internally*, chronic diarrhœa, hemorrhage, croup, etc.; *externally*, ulcers, gonorrhœa, hyperidrosis, warts, fungous granulations, edges of callous wounds, bleeding surfaces, etc. **DOSE:** as astringent 0.01 Gm. (gr. $\frac{1}{6}$); as emetic, 0.25 Gm. (gr. iv).

CORROSIVE SUBLIMATE.—See Mercury Bichloride.**COTARNINE.**—See Stypticin.**CREOLIN, PEARSON. P.**

Saponified coal-tar creosose, Pearson. Dark syrupy liquid; tar odor. Soluble in alcohol, in water to 2½ per cent. yielding a milky emulsion. Disinfectant; deodorizer. **USES:** substitute for carbolic acid, etc., in general disinfection—apartments, hospitals, school-rooms, etc. Removes odor of iodoform. *Externally* in ½–2 per cent. solution. **CAUTION:** aqueous solution should be freshly made when wanted.

CREOSOTAL.—See Creosote Carbonate.**CREOSOTE.** (Creosotum.) *Kreosotum.*

Soluble in about 150 parts of water, miscible in all proportions with alcohol. Antitubercular; antiseptic; antipyretic; anthelmintic. **USES:** phthisis, toothache, vomiting, diarrhœa, cholera morbus, dysentery, etc. Diluted applied locally in chilblains, burns, diphtheria, fetid leucorrhœa. **DOSE:** 0.2 mil (℥ iii). Preparation: water, 8 mils (dr. ii).

CREOSOTE CARBONATE. P.

Creosotal. Colorless to yellowish, odorless, slightly bitter liquid. Soluble in alcohol, insoluble in ether. Antitubercular. **USES:** like creosote. **DOSE:** 1.3 mils (℥ xx), gradually increased to 5.5 mils (dr. i $\frac{1}{3}$) 3 times a day.

CUBEBS. (Cubeba.) *Fructus Cubebæ.*

Carminative; sedative; diuretic. **USES:** gonorrhœa, leucorrhœa; bronchial, pharyngeal, and nasal catarrhs; urethritis; prostatitis. **DOSE:** 1 Gm. (gr. xv). Preparations: fluidextract, 1 mil (℥ xv); oleoresin, 0.5 Gm. (gr. viii); troches; oil, 0.5 mil (℥ viii).

DERMATOL. P.—See Bismuth Subgallate.**DEXTROSE.** (See Glucose.)**DIGITALIN.** (Merck's Amorphous.)

White yellowish powder. Soluble in water. Reliable heart tonic; diuretic; adapted for injection. **USES:** cardiac diseases, dropsy, pulmonary œdema. **DOSE:** 0.006–0.03 Gm. (gr. $\frac{1}{10}$ – $\frac{1}{2}$) 3 or 4 times daily, in pills, tablets, or subcutaneously.

DIGITALIS. (Digitalis.) *Folium Digitalis.*

USES as in digitalin. **DOSE:** 0.065 Gm. (gr. i). Preparations: extract, 0.01 Gm. (gr. $\frac{1}{6}$); fluidextract, 0.05 mil (℥ i); tincture, 1 mil (℥ xv); infusion, 8 mils (dr. ii).

DIMAZON. P.

A colorless substance similar chemically to Scarlet Red. **USES:** in an ointment in indolent ulcers and eczema. Not used internally.

DIOXYGEN. P.—See Perhydrol.**DIURETIN.** P. (Theobrominæ Sodio-Salicylas.) *Theobromino Natrium Salicylicium.*

White odorless powder, decomposing on exposure. Soluble in water. Diuretic. **USES:** dropsy, Bright's disease, especially that following scarlet fever. **DOSE:** 1 Gm. (gr. xv), 5 or 6 times daily in powder or capsule followed by water; maximum dose, 6 Gm. (dr. $1\frac{2}{3}$) daily.

DOVER'S POWDER.—See under Opium, Powdered.**EMETINE HYDROCHLORIDE.** (Emetinæ Hydrochloridum.)

A specific in conditions caused by parasitic amœbæ. Used in amœbic dysentery and in pyorrhœa alveolaris—in the latter condition locally as well as internally. Occurs usually in ampules in a $\frac{1}{12}$ per cent. sterile solution. It is given in doses of from

$\frac{1}{3}$ to $\frac{1}{2}$ a grain daily for about a week. Unless given internally in pills not soluble in the stomach will cause violent vomiting.

DUOTAL. P.—See Guaiacol Carbonate.

ELATERIN. (Elaterinum.)

Crystal powder with very bitter taste. Soluble in about 300 parts of alcohol, insoluble in water. Drastic purgative. **USES:** ascites, uræmia, pulmonary œdema, poisoning by narcotics, etc. **DOSE:** 0.005 Gm. (gr. $\frac{1}{12}$); maximum dose, 0.01 Gm. (gr. $\frac{1}{60}$), daily, in trituration with a trace of saccharin. **Preparation:** trituration (10 per cent.), 0.03 Gm. (gr. $\frac{1}{2}$).

ERGOT. (Ergota.)

Emmenagogue; oxytocic; hæmostatic. **USES:** to promote labor; menorrhagia, metrorrhagia, and other internal hemorrhages; night-sweats, migraine, epilepsy, chronic cerebral congestion, enuresis, etc. **DOSE:** 2 Gm. (gr. xxx). **Preparations:** extract (syn. ergotin), 0.5 Gm. (gr. viii); fluidextract, 2 mils (℥l xxx).

ERGOTIN.

Alcohol-purified aqueous extract of ergot. Soluble in water. **ACTION AND USES:** like ergot. **DOSE:** 0.2–0.6 Gm. (gr. iii–x).

ERIODICTYON. (Eriodictyon.)

Yerba santa. Expectorant; alterative; anticatarrhal. **USES:** coughs, colds, inflammation of the genito-urinary organs, etc., and to disguise the taste of quinine and other disagreeable remedies. **DOSE:** 1 Gm. (gr. xv). **Preparation:** fluidextract, 1 mil ℥l xv).

ERYTHROL TETRANITRATE.

Crystalline mass exploding on percussion; therefore, on the market only in tablets with chocolate, each containing gr. $\frac{1}{2}$ of the medicament. Vasodilator and antispasmodic, like nitroglycerin. **USES:** angina pectoris, asthma, cardiac diseases, chronic inflammation of the kidneys, etc.; reported especially useful as a prophylactic in preventing anginal pain. **DOSE:** 1–2 tablets every 4 hours.

ETHER. (Æther.)

Sulphuric ether. Inhalation anæsthetic; analgesic; antispasmodic. **USES:** internally, by inhalation as anæsthetic in surgical

operations; gastrodynia, colic, tetanus, nervous affections, dyspnoea, etc.; *externally*, earache, toothache, neuralgia, local pains. DOSE: 1 mil (℥ xv). Preparations: spirit, 4 mils (fldr. i); compound spirit, 4 mils (fldr. i).

ETHYL CHLORIDE. (Æthylis Chloridum.)

Gas at ordinary temperatures and pressures; when compressed, colorless liquid. Soluble in alcohol. Local anæsthetic. USES: minor and dental surgery, and neuralgia, as spray; heat of hand forcing spray from the tubes. Hold 6-10 inches away from the part. CAUTION: highly inflammable.

EUCAINE, BETA. (Betaeucainæ Hydrochloridum.)

White powder. Soluble in about 30 parts of water, 14 of alcohol. Local anæsthetic, specially intended for ophthalmic use; also in dentistry. Applied in 2-3 per cent. solution in ophthalmic and dental work; in 5-10 per cent. solution for nose and throat; also in Schleich's infiltration anæsthesia; in 5-10 per cent. ointment with 2 per cent. menthol in hemorrhoids.

EUCALYPTOL. (Eucalyptol.)

Cineol. Soluble in ether, insoluble in water. Antiseptic; expectorant; antispasmodic; antiperiodic. USES: *inhalation* in diphtheria, asthma; *internally*, colds, bronchitis, pneumonia; *externally*, rhinitis, scarlet fever, measles, and chicken-pox. DOSE: 0.3 mil (℥ v), 4 or 5 times daily, in capsules or sweetened emulsion or on sugar. Injection: 0.5-1 mil (℥ 8-15) of mixture of 2-5 eucalyptol and 10 liquid paraffin.

EUCALYPTUS.

Antiperiodic; antiseptic; tonic; hæmostatic. USES: hemorrhage, asthma, dyspepsia, malaria. DOSE: 2 Gm. (gr. xxx). Preparation: fluidextract, 2 mils (℥ xxx).

EUQUININE. P.

Quinine carbonic ether. Zimmer. Tasteless, light, fleecy conglomerations of white needles. Slightly soluble in water. Antimalarial; febrifuge; tonic. USES: malaria, febrile infectious diseases, whooping-cough, neuralgia, prophylactic, for malaria, and especially in idiosyncrasy against quinine. DOSE: 0.25 Gm. (gr. iv) in powder or tablet, or with soup, milk, or cocoa.

EUTHYMOL. P.

Antiseptic; germicide. Each fluidounce is stated to contain: oil of eucalyptus, $\frac{3}{8}$ ℥; oil of gaultheria, $\frac{9}{32}$ ℥; fluidextract of wild indigo, $1\frac{1}{4}$ ℥; boric acid, $10\frac{15}{16}$ gr.; thymol, $\frac{15}{32}$ gr.

EXTRACT, BONE MARROW. P.

Hæmatinic; nutrient. Dose: 4-8 mls (fldr. 1-2), in water, milk, or wine, three times daily.

EXTRACT, MALE FERN. (Oleoresina Aspidii.) *Extractum Filicis*.

Oleoresin male fern; oleoresin aspidium. Thick brown liquid; bitter unpleasant taste. Efficacious and safe anthelmintic. Dose: 4 Gm. (dr. i), taken in three portions at intervals of $\frac{1}{2}$ hour, in capsules, followed if necessary in 1-2 hours by calomel and jalap. CAUTION: shake well before dispensing. Oleoresin, 2 Gm. (gr. xxx).

EXTRACT, OPIUM. (Extractum Opii.) *Opii Extractum*.

Dose: 0.03 Gm. (gr. $\frac{1}{2}$); maximum dose, 0.12 Gm. (gr. ii), single; 0.3 Gm. (gr. v), daily.

EXTRACT, THYROID.—See Thyroidin.**FORMALDEHYDE. (Liquor Formaldehydi.) *Formaldehydum Solutum*.**

Aqueous solution of formaldehyde gas; about 30 per cent. Colorless, volatile liquid with a pungent odor. Non-corrosive surgical and general antiseptic (in wounds, abscesses, etc., for clothing, bed-linen, walls, etc.); antihydrotic; preservative of anatomical and botanical specimens. Applied in vapor or solution: in surgery, $\frac{1}{4}$ - $\frac{1}{2}$ per cent. solution; general antiseptics $\frac{1}{4}$ - $\frac{1}{2}$ per cent. solution or in vapor; phthisis, whooping-cough, etc., 2 per cent. spray or inhalation; excessive perspiration, 1-2 per cent. solution; for hardening anatomical specimens, 4-10 per cent. solution.

FORMALIN OR FORMOL.—See Formaldehyde.**FORMIN. P. (Hexamethylenetetramine.) *Hexamethylenamina*. (Urotropin.)**

Minute crystals. Soluble in water, slightly soluble in alcohol.

Uric acid solvent; diuretic; and urinary antiseptic. **USES:** gout, cystitis, etc. **DOSE:** 0.3-1 Gm. (gr. v-xv) 2 or 3 times daily, as tablets taken in the morning or morning and evening, in lithia water or carbonated water.

FRANGULA. (*Frangula.*) *Cortex Frangulæ.*

Buckthorn. Laxative; cathartic. **USES:** chronic constipation. Preparation: fluidextract, 1-2 mls (15-30 ℥).

GALL, OX, PURIFIED. (*Extractum Fellis Bovis.*)

Laxative; digestive. **USES:** dropsy, chronic constipation. **DOSE:** 0.125 Gm. (gr. ii).

GELSEMININE.

White, microscopic crystals. Soluble in alcohol (salts are soluble in water). Antineuralgic; antispasmodic. **USES:** neuralgia, rheumatism, dysmenorrhœa, etc.; also antidote to strychnia. **DOSE:** 0.0005-0.002 Gm. ($\frac{1}{120}$ - $\frac{1}{30}$ gr.); maximum dose, 0.002 Gm. (gr. $\frac{1}{30}$), single; 0.012 Gm. (gr. $\frac{1}{8}$), daily.

GELSEMIUM. (*Gelsemium.*) *Rhizome Gelsemii.*

Yellow jasmine. Antineuralgic; nerve sedative; antispasmodic. **USES:** neuralgia, coryza, dysuria, hysteria, dysmenorrhœa, whooping-cough, asthma, etc. **DOSE:** 0.065 Gm. (gr. i). Preparations: fluidextract, 0.05 Gm. (℥ i); tincture (10 per cent.), 0.5 mil (℥ viii).

GENTIAN. (*Gentiana.*) *Radix Gentianæ.*

Bitter tonic; alterative. **USES:** anorexia, dyspepsia, amenorrhœa, atonic gout, etc. **DOSE:** 1 Gm. (gr. xv). Preparations: extract, 0.25 Gm. (gr. iv); fluidextract, 1 mil (℥ xv); tincture (10 per cent.), 4 mls (℥ i).

GINGER. (*Zingiber.*) *Rhizoma Zingiberis.*

Aromatic carminative. **USES:** dyspepsia, flatulence, diarrhœa, colic. **DOSE:** 1 Gm. (gr. xv). Preparations: oleoresin, 0.03 Gm. (gr. $\frac{1}{2}$); fluidextract, 1 mil (℥ xv); tincture (20 per cent.), 2 mls (℥ xxx); syrup, 16 mls (℥ iv).

GLUCOSE. (*Glucosum.*)

Liquid glucose, corn syrup. A syrupy product obtained by the incomplete hydrolysis of starch, consisting chiefly of dex-

trose and dextrins. **USES:** as a diluent in certain official extracts; as a test for diabetes and as a food stimulant and diuretic, given by rectum or intravenously. A 5½ per cent. solution is given intravenously or by rectum in shock or hemorrhage, or in diabetic coma or acidosis. **DOSE:** Up to 3vi in 24 hours by mouth or injection.

GLYCO-THYMOLINE. P.

Antiseptic. **DOSE:** 4 mils (fldr. i), diluted: *externally* in about 20 per cent. solution. Contains borax, thymol, glycerin, etc.

GLYCOZONE. P.

Disinfectant; antizymotic. **DOSE:** 4-8 mils (fldr. i-ii); *enema*; 15-30 mils (floz. ½-1) in 1-2 pints of water.

GLYCYRRHIZA. (Glycyrrhiza.) *Radix Liqueritiae*.

Liquorice root. Demulcent; expectorant; corrigent. **USES:** chiefly to cover unpleasant taste of bitter preparations. **DOSE:** 2 Gm. (gr. xxx). Preparations: extract, 1 Gm. (gr. xv); pure extract, 1 Gm. (gr. xv); fluidextract, 2 mils (℥ xxx); elixir adjuvans, ad lib.; compound powder, 4 Gm. (dr. i); compound mixture, 8 mils (fldr. ii); troches, of licorice and opium.

GOLD AND SODIUM CHLORIDE. (Auri et Sodii Chloridum.) *Auro-natrium Chloratum*.

Soluble freely in water. Alterative; nervine. **USES:** syphilis, whooping-cough, cancer, hysteria, neuralgia, rheumatism, dipsomania, etc. **DOSE:** 0.005 Gm. (gr. ⅓).

GRINDELIA. (Grindelia.)

Antispasmodic; sedative; anticatarrhal. **USES:** asthma, hay fever, whooping-cough, catarrh of the bladder, etc. **DOSE:** 2 Gm. (gr. xxx). Preparation: fluidextract, 2 mils (℥ xxx).

GUAIAC. (Guaiacum.) *Resina Guajaci*.

Resin guaiac. Soluble in alcohol, insoluble in water. Diaphoretic; alterative; stimulant; laxative. **USES:** scrofula, syphilis, chronic rheumatism, gout, amenorrhœa, scarlet fever. **DOSE:** 1 Gm. (gr. xv). Preparations: tincture (20 per cent.), 4 mils (fldr. i); ammoniated tincture (20 per cent.), 2 mils (℥ xxx).

GUAIACOL. (Guaiacol.) *Guaiacolum*.

Faintly yellowish, limpid, oily liquid; characteristic aromatic

odor. Soluble in alcohol and about 100 parts of water. Anti-tubercular; antiseptic; antipyretic; local anodyne. **USES:** *internally*, phthisis, lupus, and intestinal tuberculosis, etc.; *externally* epididymitis, surgical tuberculosis, pleurisy, etc. **DOSE:** 0.5 Gm. (gr. viii).

GUAIACOL CARBONATE. (Guaiacolis Carbonas.) *Guajacolum Carbonicum.*

Duotal. Small, white, odorless crystals. Slightly soluble in alcohol, insoluble in water. Antitubercular. **DOSE:** 1 Gm. (gr. xv).

GUARANA. (Guarana.)

Antineuralgic; astringent; stimulant; tonic; anodyne. **USES:** sick-headache, diarrhœa, etc. **DOSE:** 2 Gm. (gr. xxx). **Preparation:** fluidextract, 2 mls (℥l xxx).

HAMAMELIS. (Hamamelidis Folia.)

Witchhazel. Antiseptic; astringent; styptic. **USES:** hemorrhoids, gonorrhœa, leucorrhœa, varicose veins, etc. **DOSE:** 2 Gm. (gr. xxx). **Preparation:** water, 8 mls (fldr. ii).

HELMITOL. P.

Hexamethylenetetramine-anhydromethylene citrate. Colorless crystals. Soluble in water, insoluble in alcohol. Urinary antiseptic. **USES:** cystitis, urethritis, pyelitis, etc. **DOSE:** 1 Gm. (gr. xv) 3-4 times a day.

HEMATOXYLON. (Hæmatoxylon.)

Logwood. Astringent. **USES:** chronic diarrhœa, dysentery, and relaxed condition of the intestines. **Preparation:** extract, 1 Gm. (gr. xv).

HEROIN. P.

Diacetyl morphine. White bitter powder. Insoluble in water. Cough sedative; antispasmodic. **USES:** phthisis, bronchitis, asthma, etc. **DOSE:** 0.005-0.01 Gm. (gr. $\frac{1}{12}$ - $\frac{1}{6}$).

HEROIN HYDROCHLORATE. (Diacetylmorphinæ Hydrochloridum.)

White bitter powder. Soluble in water and alcohol. **USES AND DOSE:** same as heroin.

HEXAMETHYLENETETRAMINE.—See Formin.

HOLOCAINE HYDROCHLORIDE. P.

White crystalline powder. Soluble in about 50 parts of water, 6 of alcohol. Local anæsthetic like cocaine. **USES:** chiefly in eye diseases, in 1 per cent. solution, prepared in porcelain (not in glass).

HOMATROPINE HYDROBROMIDE. (Homatropinæ Hydrobromidum.)

Small white crystals. Soluble in about 10 parts of water, 133 of alcohol. Mydriatic; antihydrotic; sedative. **USES:** chiefly as mydriatic; night-sweats, psychoses, etc. **DOSE:** 0.0005 Gm. (gr. $\frac{1}{100}$); *externally* to eye, in 1 per cent. solution.

HORMONAL. P.

An extract of the spleen of a recently fed rabbit. Contains cholin. **USES:** In intestinal atony and obstruction to promote peristalsis. **DOSE:** Given by hypodermic injection, 15 to 30 mils (ʒss-ʒi).

HYDRASTINE HYDROCHLORIDE. (Hydrastinæ Hydrochloridum.) *Hydrastininum Hydrochloridum.*

White powder. Freely soluble in water or alcohol. Astringent; dermic; hæmostatic. **USES:** *internally*, uterine hemorrhage, dyspepsia, hemorrhoids, etc.; *externally*, gonorrhœa, conjunctivitis, endometritis, leucorrhœa, cervical erosions, seborrhœa, etc. **DOSE:** 0.01 Gm. (gr. $\frac{1}{6}$) every 2 hours if necessary; *externally*, conjunctivitis, $\frac{1}{10}$ - $\frac{1}{5}$ per cent. solution; in skin diseases, 1 per cent. ointment or lotion; maximum dose; 0.1 Gm. (gr. $1\frac{1}{2}$), single; 0.3 Gm. (gr. v), daily.

HYDRASTIS. (Hydrastis.) *Rhizoma Hydrastis.*

Golden seal. Hæmostatic; cholagogue; antihydrotic; astringent. **USES:** uterine hemorrhage, jaundice, leucorrhœa, piles, gonorrhœa, spinal irritation, night-sweats, and internal hemorrhage. **DOSE:** 2 Gm. (gr. xxx). Preparations: fluidextract, 2 mils (℥ xxx); glycerite, 2 mils (℥ xxx); tincture (20 per cent.), 4 mils (ʒdr. ii).

HYDROGEN PEROXIDE.—See Solution Hydrogen Peroxide.

HYDROZONE. P.

Antiseptic. Dose: 4 mils (fldr. i), well diluted; *externally* in 2-3 per cent. solution.

HYOSCINE HYDROBROMIDE. Scopolaminæ Hydrobromidum.) *Scopolamicum. Hydrobromicum. Brometum Scopolamicum.*

Colorless crystals. Hypnotic; sedative; mydriatic. Uses: to quiet and give sleep to insane and others. Dose: 0.0005 Gm. (gr. $\frac{1}{120}$).

HYOSCYAMUS. (Hyoscyamus.) *Folium Hyoscyami.*

Henbane. Antispasmodic; hypnotic; sedative; analgesic. Uses: *internally*, spasmodic cough, irritated bladder, insomnia, hysteria, delirium tremens; *externally*, hemorrhoids. Dose: 0.25 Gm. (gr. iv). Preparations: extract, 0.065 Gm. (gr. i); fluidextract, 0.2 mil (℥ iv); tincture (10 per cent.), 1 mil (℥ xv).

ICHTHYOL. P.

Ammonium sulpho-ichthyolate. Thick brown liquid from bituminous shale found in Tyrol; bituminous odor; contains easily assimilable sulphur. Soluble in water. Antiphlogistic; antiseptic; alterative. Uses: *internally*, phthisis, skin diseases, gout, scrofula, nephritis, etc.; *externally*, 5-50 per cent. ointments, lotions, etc., in erysipelas, burns, carbuncles, chilblains, rheumatism, peritonitis, etc.; 10 per cent. with glycerin, on tampons or in suppository, in uterine or vaginal inflammation; 1-3 per cent. solution or 0.06-0.12 mil (℥ i-ii) bougies in gonorrhœa; pure in ivy poisoning. Dose: 0.2-2 mils (℥ iii-xxx), in pills or capsules, or in water.

INGLUVIN. P.

Digestive ferment obtained from gizzard of chicken. Yellowish powder. Uses: vomiting of pregnancy, dyspepsia, etc. Dose: 0.3-1.3 Gm. (gr. v-xx).

IODINE. (Iodum.) *Jodum.*

Almost insoluble in water. Antiseptic; alterative; caustic. Uses: *externally*, by inhalation in croup and bronchitis, and in ointment in skin diseases; *internally*, in scrofula, struma, syphilis, etc. Dose: 0.005 Gm. (gr. $\frac{1}{12}$). Preparations: compound liquor, 0.2 mil (℥ iii); tincture (7 per cent.), 0.1 mil (℥ ii); ointment.

IODOFORM. (Iodoformum.) *Iodoformium*.

Almost insoluble in water. Antiseptic; alterative; anæsthetic; antitubercular. *USES*: *internally*, usually in combination with tannin, in pulmonary and intestinal hemorrhage, and in scrofula and diseases of the liver; *externally*, as surgical antiseptic for wounds, sores, etc. *DOSE*: 0.25 Gm. (gr. iv). Preparation: ointment (10 per cent.); in tuberculosis and diseases of the joints, injections of a 10 per cent. oily emulsion are practised.

IPECAC. (Ipecacuanha.) *Ipecacuanha Radix*.

Emetic; diaphoretic; expectorant. *USES*: as emetic in poisoning, croup, etc.; bronchitis, coughs, pulmonary hemorrhage, hiccough, etc. *DOSE*: expectorant, 0.065 Gm. (gr. i); emetic, 1 Gm. (gr. xv). Preparations; fluidextract, expectorant, 0.05 mil (℥ i), emetic, 1 mil (℥ xv); wine, 1 mil (℥ xv); syrup, expectorant, 1 mil; emetic, 15 mls (fldr. iv); powder of ipecac and opium, 0.5 Gm. (gr. viii); tincture of ipecac and opium (10 per cent.), 0.5 mil (℥ viii).

IRON BY HYDROGEN. (Ferrum Reductum.) *Ferrum Reductum*.

Reduced iron; Quevenne's iron. Chalybeate. *USES*: anæmia, chlorosis, hysteria, neuralgia, scrofula, debility, etc. *DOSE*: 0.065 Gm. (gr. i), in pill or tablets.

IRON CARBONATE MASS. (Massa Ferri Carbonatis.)

Vallets mass. 20 per cent. FeCO_3 . Hæmatinic. *USES*: anæmia, etc. *DOSE*: 0.2–0.3 Gm. (gr. iii–v), in pill.

IRON SULPHATE. (Ferri Sulphas.) *Ferrum Sulphuricum*.

Soluble in about 2 parts of water, insoluble in alcohol. Tonic; astringent; chalybeate. *USES*: *internally*, anæmia and chlorosis, especially with tendency to hemorrhage, night-sweats; *externally* leucorrhœa, eczema, etc. *DOSE*: 0.2 Gm. (gr. iii). Preparations: dried sulphate, 0.125 Gm. (gr. ii); granulated sulphate, 0.2 Gm. (gr. iii).

IRON AND AMMONIUM CITRATE. (Ferri et Ammonii Citras.) *Citras Ferrico-Ammonicus*.

Reddish brown, transparent, hygroscopic scales. Soluble freely in water, insoluble in alcohol. Chalybeate like other iron compounds. *DOSE*: 0.25 Gm. (gr. iv). Preparation: wine or iron, 8 mls (fldr. ii).

IRON AND QUININE CITRATE. (Ferri et Quininæ Citras.)*Chininum Ferro-Citricum.*

Freely soluble in water, partially in alcohol. Tonic; emmenagogue; astringent; antipyretic. **USES:** where quinine and iron are indicated. **DOSE:** 0.25 Gm. (gr. iv).

JALAP. (Jalapa.) *Tubera Jalapa.*

Diuretic; hydragogue; cathartic, anthelmintic. **USES:** dropsy, cerebral hyperæmia, constipation, worms, etc. **DOSE:** 1 Gm. (gr. xv). Preparations: resin, 0.125 Gm. (gr. ii); compound powder, 2 Gm. (gr. xxx).

KINO. (Kino.)

Astringent; styptic. **USES:** diarrhœa, pyrosis, leucorrhœa, passive hemorrhages, diabetes, etc. **DOSE:** 0.5 Gm. (gr. viii). Preparation: tincture (5 per cent.), 4 mils (fldr. i).

LACTOPEPTINE. P.

Digestive. **DOSE:** 0.6-1.3 Gm. (gr. x-xx).

LACTOSE.—See Milk Sugar.**LACTUCARIUM.** (Lactucarium.)

Partly soluble in alcohol and water. Anodyne; hypnotic; sedative. **USES:** nervousness, cough. **DOSE:** 1 Gm. (gr. xv). Preparations: tincture, 2 mils (℥ xxx); syrup, 8 mils (fldr. ii).

LANOLIN. P.—See Lanum.**LANUM.** (Adeps Lanæ Hydrosus.) *Lanolinum.*

Hydrous wool fat. A superior wool fat especially prepared for medical and pharmaceutical uses. Yellowish-white unctuous mass; freely takes up water and aqueous solutions. Neutral, non-irritating, permanent emollient, and base for ointments and creams; absorbed very rapidly from the skin.

LAPACTIC PILLS.

Pills of aloes, strychnia and belladonna with ipecac. **USES:** Chronic constipation. **DOSE:** 1 to 2 pills.

LEAD ACETATE. (Plumbi Acetas.)

Soluble in about 3 parts of water, 25 of alcohol. Astringent; styptic; antihydrotic. **USES:** internally, diarrhœa, dysentery,

gastric and intestinal hemorrhage, phthisical night-sweats, etc.; *externally*, astringent eye lotion and injection or wash (1:100-1:500) in gonorrhœa. Dose: 0.065 Gm. (gr. i).

LIME, SULPHURATED. (Calcii Sulphidum Crudum.)

(So-called calcium sulphide.) Slightly soluble in water, insoluble in alcohol. Alternative; depilatory. Uses: chiefly in boils, carbuncle, acne, scrofula, phthisis. Dose: 0.015-0.12 Gm. (gr. $\frac{1}{4}$ -2).

LIME WATER.—See Solution Calcium Hydrate.

LIQUOR.—See Solution.

LISTERINE. P.

Antiseptic. Doses 4 mils (fldr. i), diluted. Uses: *externally* in solution up to 20 per cent. Contains boric acid, menthol, etc.

LITHIUM CITRATE. (Lithii Citras.)

Colorless crystals. Soluble in about 5 parts of water, insoluble in alcohol. Uses: like other lithium salts but more agreeable and less irritating to the stomach. Dose: 0.5 Gm. (gr. viii). Preparation: effervescent citrate, 8 Gm. (dr. ii).

LITHIUM SALICYLATE. (Lithii Salicylas.)

White powder. Freely soluble in water and alcohol. Anti-arthritic; antirheumatic. Uses: gout and articular rheumatism instead of sodium salicylate. Dose: 1 Gm. (gr. xv).

LOBELIA. (Lobelia.) *Herba Lobelia.*

Antispasmodic; expectorant. Uses: spasmodic asthma, whooping-cough, croup, pneumonia, and colds. Dose: 0.5 Gm. (gr. viii). Preparations: fluidextract, 0.5 mil (℥ viii); tincture (10 per cent.), expectorant, 1 mil (℥ xv), emetic, 4 mils (fldr. i).

LUNAR CAUSTIC.—See Silver Nitrate.

LYSOL. P.

Brown, oily liquid. Soluble in water and alcohol. Antiseptic; disinfectant. Application: $\frac{1}{2}$ -2 per cent. solution.

MAGNESIUM CARBONATE. (Magnesii Carbonas.) *Magnesium Carbonicum.*

Insoluble in water or alcohol. Antacid; laxative; antilithic. Uses: constipation, sour stomach, heartburn, stone in bladder. Dose: 3 Gm. (dr. $1\frac{1}{2}$).

MAGNESIUM OXIDE. (Magnesii Oxidum.)

Light or calcined magnesia. Light white powder; slightly alkaline taste. Soluble in carbonic acid water. Antacid; laxative; antilithic. *USES*: *internally*, sick-headache, gout, dyspepsia, sour stomach, constipation; *externally*, ulcers and abraded surfaces, in tooth powders, etc. *DOSE*: 2 Gm. (gr. xxx).

MAGNESIUM SULPHATE. (Magnesii Sulphas.) *Magnesium Sulphuricum.*

Epsom salt. Soluble in $1\frac{1}{2}$ parts of water, insoluble in alcohol. Cathartic; refrigerant. *USES*: constipation, lead colic, fevers, inflammatory affections. *DOSE*: 16 Gm. (dr. iv). Preparation: effervescent magnesium sulphate, 16 Gm. (dr. iv).

MENTHOL. (Menthol.)

Soluble in less than its weight of alcohol, insoluble in water. Analgesic; anæsthetic; antiseptic; stimulant. *USES*: *internally*, nervous diarrhœa, vomiting; *externally*, toothache, headache, neuralgia, insects' bites, pruritus, inhalation in hay fever, asthma, and chronic bronchitis. *DOSE*: 0.065 Gm. (gr. i); maximum dose, 6 Gm. (dr. $1\frac{1}{2}$), daily. For toothache, put a crystal into cavity. Tampons, 1 in 5 of oil.

MERCURY. (Hydrargyrum.)

Preparations: mercury with chalk, 0.25 Gm. (gr. iv); mass of mercury, 0.25 Gm. (gr. iv); ointment (50 per cent.); dilute ointment; plaster.

MERCURY AMMONIATED. (Hydrargyrum Ammoniatum.)
*Hydrargyrum Præcipitatum Album.***MERCURY BICHLORIDE.** (Hydrargyri Chloridum Corrosivum.) *Hydrargyrum Bichloratum.*

Corrosive sublimate. Soluble in 20 parts of water, 5 of alcohol. Tonic; antiseptic; caustic; alterative; germicide. *USES*: *internally*, syphilis, chronic rheumatism, and skin diseases; *externally*, in collodion as caustic; nævi, etc.; in alcohol, in ring-worm; in leprosy, ulcers, various skin diseases, antiseptic dressings, surgical operations, diphtheria, disinfection, etc. *DOSE*: 0.003 Gm. (gr. $\frac{1}{20}$); maximum dose, 0.02 Gm. (gr. $\frac{1}{3}$), single; 0.065 Gm. (gr. i), daily.

MERCURY CHLORIDE, MILD. (Hydrargyri Chloridum Mite.)*Hydrargyrum Chloratum.*

Calomel. Insoluble in water or alcohol. Cathartic; alterative; diuretic; antiseptic; anthelmintic. *USES: internally*, constipation, cholera, dysentery, cardiac dropsy, pleurisy, malaria, syphilis, worms, infectious diseases, gout, etc.; *externally*, smallpox pitting, pruritus, warts, etc. *DOSE: laxative*, 0.125 Gm. (gr. ii); alterative, 0.065 Gm. (gr. i). *Preparation*: compound cathartic pill.

MERCURY CYANIDE.

Colorless crystals. Soluble in about 15 parts of water, 20 of alcohol. Alterative; antiseptic; tonic; antisyphilitic. *USES: instead of corrosive sublimate*; much less irritating. Recommended in syphilis. *DOSE: 0.005–0.01 Gm. (gr. $\frac{1}{12}$ – $\frac{1}{8}$) in solution*; *externally* (gargle), 1–10,000 solution; *hypodermatically*, 0.005–0.01 Gm. (gr. $\frac{1}{12}$ – $\frac{1}{8}$).

MERCURY IODIDE, RED. (Hydrargyri Iodidum Flavum.)*Hydrargyrum Iodatum Flavum.*

Mercury biniodide. Almost insoluble in water, soluble in 300 parts of olive oil. Alterative; germicide; antiseptic; antisyphilitic; emmenagogue. *USES: internally and externally*, in syphilis, scrofula, lupus. *DOSE: 0.003 Gm. (gr. $\frac{1}{20}$)*. *Preparation*: Solution of arsenic and mercury iodide, 0.1 mil (℥ ii).

MERCURY IODIDE, YELLOW. (Hydrargyri Iodidum Rubrum.) *Hydrargyrum Bijodatum.*

Mercury proto-iodide; green mercurius iodide. Insoluble in water and alcohol. Antisyphilitic; emmenagogue; alterative. *USES: advanced syphilis, scrofula, etc.* *DOSE: 0.01 Gm. (gr. $\frac{1}{6}$)*.

MERCURY SALICYLATE. (Hydrargyri Salicylas.)

White powder; about 50 per cent. mercury. Insoluble in water and alcohol. Antisyphilitic; antigonorrhœic, alterative. *USES: externally*, chancre, gonorrhœa, and venereal affections; 1 per cent. powder or ointment; injection in urethra, 1: 10,000–5: 10,000 solution. *DOSE: 0.02–0.06 Gm. (gr. $\frac{1}{3}$ –1)*.

MERCURY SUCCINAMIDE.

Mercury imido-succinate. White powder. Soluble in about 25 parts of water with the aid of heat, slightly soluble in alcohol.

Antisymphilitic; alterative; antiseptic. DOSE: 0.012–0.02 Gm. (gr. $\frac{1}{8}$ – $\frac{1}{4}$) daily hypodermatically.

MESOTAN. P.

Methyloxymethylester of salicylic acid. Yellow liquid. Soluble in alcohol. Local antirheumatic. USES: gout, rheumatism, etc. Application: 4 mils (fldr. i) of a mixture of equal parts of mesotan and olive oil.

METHYL SALICYLATE. (Methylis Salicylas.)

Synthetic oil of wintergreen (oil of gaultheria). Freely soluble in alcohol. USES: inflammatory articular rheumatism. DOSE: 1 mil (gr. xv), gradually increased. Also applied locally in chronic articular rheumatism.

METHYLENE BLUE. (Methylthioninæ Chloridum.)

Tetramethylthionine hydrochloride. Bluish crystals or blue powder. Soluble in about 50 parts of water. Anodyne; antiperiodic; antipyretic. USES: gonorrhœa, rheumatism. DOSE: 0.25 Gm. (gr. iv); injection; 0.06 Gm. (gr. i); maximum dose, 1 Gm. (gr. xv), single or daily.

METHYLMORPHINE.—See Codeine.

MILK OF MAGNESIA. (Magma Magnesiae.)

Liquid magnesia, each 30 mils (flox. i) representing 1.5 Gm. (gr. xxiv) magnesium hydrate in permanent suspension. Antacid. DOSE: 4–15 mils (fldr. i–iv).

MILK SUGAR. (Saccharum Lactis.)

Lactose. Soluble in about six parts of water, insoluble in alcohol. Nutritive; diuretic. USES: consumption, cardiac dropsy, and wasting diseases; also in infant nutrition. DOSE: 30–180 Gm. (oz. i–vi) per day.

MINERAL OIL, OR RUSSIAN MINERAL OIL. (See Petrolatum Liquid.)

A name applied to a filtered and purified light petroleum oil somewhat lighter than liquid petrolatum. It is, when pure, colorless and tasteless. Does not digest or absorb and promotes bowel movements by softening and lubricating the fæces. DOSE: one or two tablespoonfuls daily.

MORPHINE SULPHATE. (*Morphinæ Sulphas.*)

Soluble in about 21 parts of water. **USES:** to relieve pain, nervous excitement, etc. **DOSE:** 0.015 Gm. (gr. $\frac{1}{4}$). **Preparation:** compound powder, 0.5 Gm. (gr. viii).

MUSK. (*Moschus.*)

Stimulant and antispasmodic. **USES:** nervous affections, typhus and typhoid fever, convulsions, etc. **DOSE:** 0.25 Gm. (gr. iv). **Preparation:** tincture (5 per cent.).

MYRRH. (*Myrrha.*) *Gummi-resina Myrrha.*

Astringent; carminative; cathartic; emmenagogue. **USES:** *internally*, dyspepsia, general debility, chronic catarrh, amenorrhœa, chlorosis, and pectoral troubles; *externally*, unhealthy sores, sore gums, and sore mouth. **DOSE:** 0.5 Gm. (gr. viii). **Preparations:** tincture (20 per cent.), 1 mil (℥ xv); tincture of aloes and myrrh (10 per cent.), 2 mils (℥ xxx); pill of aloes and myrrh, 2 pills.

NOVOCAINE. P.

Colorless needles, soluble in their weight of water. Local anæsthetic, less toxic than cocaine. **USES:** 1 per cent. solution infiltrated by injection to produce anæsthesia. May be boiled.

NAPHTHOL BETA. (*Bethanaphthol.*) *Naphtholum.*

Soluble in about 1 part of alcohol, insoluble in water. Antiseptic; parasticide. **USES:** *internally*, typhoid, chronic diarrhœa; *externally*, psoriasis, eczema, scabies, and other skin diseases, in 2-10 per cent. ointment. **DOSE:** 0.2-0.5 Gm. (gr. iii-viii); maximum dose, 1 Gm. (gr. xv), single; 4 Gm. (dr. i), daily.

NEOSALVARSAN. P.

A soluble modification of Salvarsan, used in the same manner and for the same conditions as the latter. Is less irritating, but not so efficacious, unless used in larger, or more frequent doses. **DOSE:** 0.6 to 0.9 Gm. (grs. ix-xiv), intravenously or intramuscularly, in twice distilled water.

NUTGALL. (*Galla.*) *Gallæ.*

Galls. Astringent. **USES:** *internally*, chronic dysentery, diarrhœa, poisoning by strychnine and other alkaloids; *externally*, prolapsus ani, hemorrhoids, and as gargle in ulcerated fauces

and relaxed uvula. DOSE: 0.5 Gm. (gr. viii). Preparations: tincture, 20 per cent.), 4 mils (dr. i); ointment.

NUTMEG. (*Myristica*.) *Semen Myristica*.

Aromatic; carminative. DOSE: 0.5 Gm. (gr. viii). Preparation: oil, 0.2 mil (℥ iii).

NUX VOMICA. (*Nux Vomica*.) *Strychni Semen*.

Stomachic; tonic; respiratory stimulant. USES: chronic constipation, dyspepsia, nervous diseases, neuralgia, and as antidote to poisoning by opium, chloral, and other narcotics. DOSE: 0.065 Gm. (gr. i). Preparations: extract, 0.015 Gm. (gr. ¼); fluidextract, 0.05 mil (℥ i); tincture (10 per cent.), 0.6 mil (℥ iv).

OIL, ALMOND, BITTER. (*Oleum Amygdalæ Amaræ*.) *Aetheroleum Amygdalæ Amaræ*.

Soluble in all proportions of alcohol, in about 300 parts of water. Nerve sedative. USES: *internally*, coughs; *externally*, to allay severe itching and in neuralgia. DOSE: 0.03 mil (℥ ½).

OIL, BETULA. (See *Methylis Salicylatis*.)

Oil sweet birch. USES, DOSE, etc., as of oil of gaultheria.

OIL, CADE. (*Oleum Cadinum*.)

Juniper tar. USES: in psoriasis, favus, gout, rheumatism, chronic skin eruptions, etc.

OIL, CAJUPUT. (*Oleum Cajuputi*.)

Stimulant; diaphoretic. USES: *internally*, bronchitis, catarrh, toothache, colic, flatulence, asthma, and tapeworms; *externally*, psoriasis, acne, pityriasis, and neuralgia. DOSE: 0.5 mil (℥ viii).

OIL, CASTOR. (*Oleum Ricini*.)

Cathartic. USES: constipation, colic, diarrhœa, and dysentery. DOSE: 16 mils (fldr. iv).

OIL, COD-LIVER. (*Oleum Morrhuæ*.) *Oleum Jecoris Aselli*.

Alterative; nutrient. USES: tuberculosis, scrofula, rheumatism, etc. DOSE: 16 mils (fldr. iv).

OIL, CROTON. (*Oleum Tiglii*.)

Purgative; rubefacient. USES: *internally*, obstinate constipation, dropsy; *externally*, rheumatism, neuralgia, and indolent swellings; *hypodermically* to nævi. DOSE: 0.05 mil (℥ i).

OIL, EUCALYPTUS. (*Oleum Eucalypti.*)

Antiseptic; antipyretic; disinfectant. *USES:* *internally*, remittent fever, bronchitis, and by inhalation in asthma and catarrh; *externally*, skin diseases (in 1:5 oily solution). *DOSE:* 0.5 mil (℥ viii).

OIL, GAULTHERIA. (*Methylis Salicylas.*)

Oil wintergreen. Analgesic; antirheumatic; antiseptic. *USES:* rheumatic affections, pleurisy pericarditis; *externally*, orchitis, epididymitis, articular rheumatism, etc. *DOSE:* 1 mil (℥ xv). *Preparation:* spirit, flavoring.

OIL, JUNIPER BERRIES. (*Oleum Juniperi.*) *Aetheroleum Juniperi.*

Diuretic; carminative; stimulant. *USES:* *internally*, dropsy and suppression of urine. In surgery, for preserving surgical ligatures. *DOSE:* 0.2 mil (℥ iii). *Preparations:* spirit, 2 mils (℥ xxx); compound spirit, 8 mils (fldr. ii).

OIL, MUSTARD. (*Oleum Sinapis Volatile.*) *Oleum Sinapis Aethereum.*

Rubefacient; stimulant. *USES:* instead of mustard plaster in pleuritic neuralgia or rheumatic pains. *DOSE:* 0.008 mil (gr. $\frac{1}{8}$). *Preparation:* compound liniment.

OIL, OLIVE.

Emollient; nutritive; laxative. *USES:* *internally*, constipation, worms, poisoning, gall-stones, etc.; *externally*, blistered or injured surfaces, etc. *DOSES* 30 mil (fldr. viii).

OIL, PINUS. (*Oleum Pini Pumilionis.*)

Oil dwarf pine. Fragrant oil; terbinthinous taste. Soluble in alcohol. Antiseptic; expectorant. *USES:* inhalation in pectoral affections; *internally*, as stimulating expectorant; *externally*, employed in skin diseases. *DOSES* 0.3–0.6 mil (℥ v–x).

OIL, SANTAL. (*Oleum Santali.*)

Oil sandalwood. Internal antiseptic; anticatarrhal. *USES:* gonorrhœa, gleet, bronchitis, and inflammation of mucous membranes generally. *DOSE:* 0.5 mil (℥ viii).

OIL, TAR. (*Oleum Picis Liquidæ Rectificatum.*)

Antiseptic. *USES:* *internally*, bronchial affections; chiefly used *externally* in skin diseases. *DOSE:* 0.2 mil (℥ iii).

OIL, TURPENTINE. (*Oleum Terebinthinæ.*)

Anthelmintic; antiseptic; diuretic; rubefacient. **USES:** rheumatism, sciatica, lumbago, gonorrhœa, hæmoptysis, worms, amenorrhœa, and as antidote in phosphorus poisoning. For *internal* use only the rectified oil answers. **DOSE:** 1 mil (℥ xv).

OIL, WINTERGREEN, ARTIFICIAL.—See Methyl Salicylate.

OIL, WINTERGREEN, TRUE.—See Oil, Gaultheria.

OINTMENT, MERCURIC NITRITE. (*Unguentum Hydrargyri Nitratis.*)

Citrine ointment. Stimulant and alterative dermic. Applied in 10–50 per cent. dilution with a fatty vehicle.

OLEATE, MERCURY. (25 per cent.) (*Oleatum Hydrargyri.*)

Alterative; antiparasitic; antisyphilitic. **USES:** *externally*, skin diseases, pediculi, also for endermic administration of mercury.

OLEORESIN, CAPSICUM.

Soluble in alcohol and ether. Rubefacient; stimulant. **USES:** *internally*, flatulence, and to arouse appetite; *externally*, diluted with soap liniment or olive oil, in lumbago, neuralgia, and rheumatic affections. **DOSE:** 0.03 Gm. (gr. ½).

OLEORESIN, MALE FERN.—See Extract, Male Fern.

OPIUM. (*Opium.*)

Not less than 9.5 per cent. morphine. For action, uses, etc., see opium, powdered.

OPIUM, POWDERED. (*Opium Pulvis.*) *Pulvis Opium.*

Morphine, 10–10.5 per cent. Stimulant; narcotic; antispasmodic; hypnotic; anodyne. **USES:** insomnia, neuralgia, colic, dyspepsia, diabetes, pleurisy, peritonitis, tetanus, delirium tremens, cholera, dysentery, etc.; ease pain, give rest and sleep, check morbid secretions, relieve cough, and allay irritability. **DOSE:** 0.1 Gm. (gr. ii). Modifications: powdered opium, granulated opium, and deodorized opium, dose of all, 0.065 Gm. (gr. i). Preparations: extract, 0.03 Gm. (gr. ½); tincture (10 per cent.), 0.5 mil (℥ viii); deodorized tincture (10 per cent.), 0.5 mil (℥ viii); wine, 0.5 mil (℥ viii); vinegar, 0.5 mil (℥ viii);

tincture of ipecac and opium, 0.5 mil (℥ viii) ; powder of ipecac and opium, 0.5 Gm. (gr. viii) ; camphorated tincture, 8 mils (℥dr. ii) ; pill, 1 pill ; troches of licorice and opium (0.005 Gm. in each) ; plaster.

ORPHOL.—See Bismuth Betanaphtholate.

ORTHOFORM. P.

White odorless powder. Slightly soluble in water, soluble in alcohol. Local and internal anodyne, antiseptic. **USES:** chiefly *externally* on painful burns, wounds, toothache, etc. Applied pure or in 10–20 per cent. mixtures with starch talcum, etc., or in 10–20 per cent. ointment. **DOSE:** 0.5–1 Gm. (gr. viii–xv).

OVARIAN EXTRACT.

A powder prepared from dried ovaries of pigs. **USES:** In premature menopause, etc. **DOSE:** 0.1–0.2 Gm. (gr. ii–iv).

OVOFERRIN. P.

An iron salt combined with albumin. **USES:** As a hematinic in anemia. **DOSE:** 8–16 mils (℥ii–℥iv).

PANCREATIN. (Pancreatinum.)

Amylolytic ; proteolytic ; emulsifiant. **USES:** aid to duodenal digestion. **DOSE:** 0.3–1 Gm. (gr. v–xv).

PAPAIN. P.

Papayotin. Concentrated active principle of juice of *Carica Papaya* (pawpaw). Enzyme similar to pepsin but acting in alkaline, acid, or neutral solution. Whitish, slightly hygroscopic powder. Soluble in water, insoluble in alcohol. Digestive. **USES:** for dissolving false membrane and for aiding digestion. **DOSE:** 0.12–0.3 Gm. (gr. ii–v), with sodium bicarbonate ; *externally* in 5 per cent. solution equal parts of glycerin and water, for diphtheria and croup.

PARALDEHYDE. (Paraldehydum.)

Colorless fluid ; crystal below 10.5° C. : aromatic, suffocating odor ; warm taste. Soluble in alcohol and about 10 parts of water. Hypnotic ; antispasmodic ; stimulant. **USES:** insomnia, asthma, phthisis, chorea, alcoholism, delirium tremens, insanity, mental exhaustion, etc. **DOSE:** 2–6 mils (℥dr. ½–1½), well

diluted in elixir, sweet water, brandy, or rum; maximum dose, 10 mils (fldr. $2\frac{1}{2}$).

PASTE, LASSARS.

A zinc oxide ointment made stiff with starch. For formula see p. 268. USES: In eczema, applied to the skin.

PASTE, UNNAS.

A gelatin paste of zinc oxide. For formula see p. 268. USES: In leg ulcers, eczema, etc., as a dressing. Applied melted and painted over a gauze bandage.

PELLETIERINE TANNATE. (Pelletierinæ Tannas.)

Grayish-brown, hygroscopic, tasteless powder. Soluble in about 80 parts of alcohol, 700 of water. Anthelmintic; teniafuge. Dose: 0.25 Gm. (gr. iv) in 30 mils (flox. i) of water, followed in 2 hours by a cathartic.

PEPPERMINT. (Mentha Piperita.) *Folio Menthæ Piperitæ.*

Carminative, diffusible stimulant; nervine. USES: flatulence, colic, dysentery, nausea, and nervous affections; *externally* (usually as oil of peppermint), in headache, toothache, neuralgia, rheumatism, catarrh, hay fever, asthma, etc.

PEPSIN. (Pepsinum.)

Soluble in about 100 parts of water (with turbidity); insoluble in alcohol. Proteolytic. USES: *internally*, dyspepsia, digesting false membranes; *externally*, digesting gangrenous tissue from unhealthy wounds. Dose: 0.25 Gm. (gr. iv).

PEPSIN, SACCHARATED. (Pepsinum Saccharatum.)

Dose: 4-10 Gm. (dr. $1-1\frac{1}{2}$).

PEPTENZYME. P.

Digestant. Dose: 0.2-0.6 Gm. (gr. iii-ix).

PEPTO-MANGAN (GUDE). P.

Hæmatinic. Dose: 4-15 mils (fldr. i-iv).

PERHYDROL. P.

Hydrogen peroxide, 30 per cent. by weight (or 100 per cent, by volume), H_2O_2 . Miscible in all proportions with water or alcohol. Disinfectant; deodorant; styptic; antizymotic. Use:

chiefly *externally*, in diphtheria, sore throat, wounds, gonorrhœa, abscesses, etc.; *internally*, in flatulence, gastric affections, phthysical sweats, etc.; *hypodermically* (0.2 per cent. solution), in cyanide poisoning. Dose: 4 mils (fldr. i).

PETROLATUM, LIQUID. (Petrolatum Liquidum.)

Mineral oil. A clear oily liquid, almost tasteless. Two varieties, light and heavy. Used as an intestinal lubricant in chronic constipation. Dose: 15-30 mils (fldr. iv to ʒi)

PHENACETIN. (Acetphenetidinum.) *Phenacetinum.*

Para-acetphenetidin. White tasteless powder. Soluble in about 1700 parts of water, 20 of alcohol. Antipyretic; antineuralgic; analgesic. Uses: *internally*, neuralgia, rheumatism, whooping-cough, chorea, influenza, tonsillitis, scarlatina. Dose: 0.5 Gm. (gr. viii).

PHENALGIN. P.

Analgesic; febrifuge. Dose: 0.6-1.3 Gm. (gr. x-xx).

PHENAZONE.—See Antipyrin.

PHENOL.—See Carbolic Acid.

PHENYLACETAMIDE.—See acetanilid.

PHENYL SALICYLATE.—See Salol.

PHOSPHORUS. (Phosphorus.)

Soluble in oils. Stimulant to the nervous system. Uses: melan-
cholia, sexual exhaustion, neuralgia, rhachitis, caries, osteo-
malacia, etc. Dose: 0.0005 Gm. (gr. $\frac{1}{100}$). Preparation: pill,
containing 0.0006 Gm. (gr. $\frac{1}{100}$).

PHYSOSTIGMA. (Physostigma.)

Calabar bean. ACTION AND USES: like physostigmine. Dose: 0.1 Gm. (gr. ii). Preparations: extract, 0.008 Gm. (gr. $\frac{1}{8}$); tincture (10 per cent.), 1 mil (℥ xv).

PHYSOSTIGMINE SALICYLATE. (Physostigminæ Salicylas.)

Physostigminum Salicylicum.

Eserine salicylate. Slightly yellowish crystals. Soluble in about 150 parts of water, 15 of alcohol. Antitetanic; spinal

depressant; peristaltic; stimulant; laxative; analgesic; myotic. Uses: strychnine poisoning, tetanus, tonic convulsions, constipation, muscular rheumatism, phantom tumors, chronic bronchitis, etc.; in solution to contract pupil. Dose: 0.001 Gm. (gr. $\frac{1}{100}$); maximum dose, 0.002 Gm. (gr. $\frac{1}{50}$), single; 0.003 Gm. (gr. $\frac{1}{20}$) daily. Application in 0.2–0.5 per cent. solution as eye-drops in ophthalmia neonatorum, to overcome midriasis of atropine, breaking posterior adhesions, in prolapse of the iris, cataract, glaucoma, and corneal ulcers.

PICROTOXIN.

Cocculin. Soluble in about 300 parts of water, 10 of alcohol. Antihydrotic; nervine; antispasmodic. Uses: night-sweats of phthisis; also paralysis, epilepsy, chorea, flatulent dyspepsia, dysmenorrhœa; also antidote to chloral. Dose: 0.0006–0.002 Gm. (gr. $\frac{1}{100-1/30}$); Maximum dose, 0.006 Gm. (gr. $\frac{1}{10}$).

PILOCARPINE HYDROCHLORIDE. (Pilocarpinæ Hydrochloridum.) *Pilocarpinum Hydrochloricum*.

Freely soluble in water or alcohol. Sialagogue; galactagogue; myotic; diaphoretic; diuretic. Uses: *internally*, dropsy, coryza, laryngitis, bronchitis, asthmatic dyspnoea, uræmic convulsions, croup, atropine poisoning, etc.; *externally*, 1–2 per cent. aqueous solution for collyrium. Contra-indicated in heart failure and during fasting. Dose: 0.01 Gm. (gr. $\frac{1}{100}$); maximum dose, 0.02 Gm. (gr. $\frac{1}{50}$), single; 0.04 Gm. (gr. $\frac{1}{25}$), daily.

PILOCARPUS. (Pilocarpus.)

Jaborandi. ACTION AND USES: like pilocarpine hydrochlorate. Dose: 2 Gm. (gr. xxx). Preparation: fluidextract, 2 mls (℥ xxx).

PIPERAZINE. P.

Diethylenediamine. Colorless alkaline crystals. Freely soluble in water. Antipodagric; antirheumatic. Dose: 0.3–0.6 Gm. (gr. v–x) 3 times a day well diluted.

PITUITRIN. P. (Liquor Hypophysis.)

An extract of the posterior portion of the pituitary gland of certain animals. It occurs in a watery solution. PHYSIOLOGICAL ACTION: It is reputed to cause a rise of blood-pressure lasting

for an hour or more, it has a marked diuretic action and increases the contractility of the muscle of the uterus. **USES:** In circulatory collapse accompanied by low blood-pressure, in prolonged or difficult labor, and in uterine hemorrhage it is recommended in doses of 1 mil (15 m.) given preferably subcutaneously.

PODOPHYLLIN.—See Resin, Podophyllum.

PODOPHYLLUM. (Podophyllum.)

May apple. Cathartic; cholagogue, tonic, alterative. **USES:** hepatic congestion, constipation, rheumatism, scrofula, and bilious fevers. **DOSE:** 0.5 Gm. (gr. viii). **Preparations:** resin, purgative, 0.015 Gm. (gr. $\frac{1}{4}$), laxative, 0.005 Gm. (gr. $\frac{1}{10}$); fluidextract, 0.5 Gm. (gr. viii); pill, 1 pill.

POMEGRANATE. (Granatum.)

Anthelmintic; astringent; antiperiodic. **USES:** tapeworms, diarrhœa, night sweats and intermittent fever. **DOSE:** 2 Gm. (gr. xxx). **Preparation:** fluidextract, 2 mils (℥ ii).

POTASSA.—See Potassium Hydrate.

POTASSA, SULPHURATED. (Potassa Sulphurata.)

Soluble readily and almost completely in water, partially soluble in alcohol. Alterative; antacid; emetic; local irritant. **USES:** *internally*, rheumatism, gout, scrofula, painter's colic, skin disease, catarrh, croup, lead and mercury poisoning; *externally*, lotion in parasitic skin diseases. **DOSE:** 0.12–0.6 Gm. (gr. ii–x).

POTASSIUM ACETATE. (Potassi Acetas.)

Very deliquescent. Soluble in less than 1 part of water, 2 of alcohol. Diuretic; aperient; cathartic. **USES:** gout, lithiasis, rheumatism, dropsy, eczema, and psoriasis. **DOSE:** 2 Gm. (gr. xxx).

POTASSIUM BICARBONATE. (Potassii Bicarbonas.) *Kalium Bicarbonicum.*

Soluble in about 4 parts of water, almost insoluble in alcohol. Diuretic, antilithic; antacid. **USES:** dyspepsia, dropsy, lithiasis, sour stomach, jaundice, etc. Usually taken effervescent with tartaric or citric acid. **DOSE:** 2 Gm. (gr. xxx).

POTASSIUM BITARTRATE. (Potassi Bitartras.) *Kalium Bitartaricum.*

Cream of tartar. Soluble in about 200 parts of water, insoluble in alcohol. Cathartic; diuretic; aperient. **USES:** dropsy and as refrigerant drink in febrile affections. **DOSE:** diuretic, 2 Gm. (gr. xxx); cathartic, 15 Gm. (dr. iv).

POTASSIUM BROMIDE. (Potassii Bromidum.) *Kalium Bromatum.*

Soluble in about 2 parts of water. Antiepileptic; sedative; hypnotic. **USES:** epilepsy, neurasthenia, convulsions, delirium tremens, tetanus, syphilis, scrofula, semi-impotence, nyphomania, urethral fever, and poisoning by iodoform and strychnia. **DOSE:** 1 Gm. (gr. xv).

POTASSIUM CARBONATE. (Potassii Carbonas.) *Kalium Carbonicum.*

Soluble in 2 parts of water, insoluble in alcohol. Antacid; solvent. **USES:** *internally*, acid stomach, lithiasis, dropsy, jaundice; *externally*, as 16 per cent. ointment or bath in cutaneous affections. **DOSE:** 1 Gm. (gr. xv).

POTASSIUM CHLORATE. (Potassii Chloras.) *Kalium Chloricum.*

Soluble in 17 parts of water, insoluble in alcohol. Antiseptic. **USES:** *internally*, all forms of stomatitis, diphtheria, mercurial poisoning, and diseases of mucous membranes; also as mouth washes and gargles in 3-5 per cent. solution. **DOSE:** 0.25 Gm. (gr. iv).

POTASSIUM CITRATE. (Potassii Citras.)

Soluble in about 1 part of water, slightly in alcohol. Diaphoretic; refrigerant. **USES:** lithiasis, fevers, and bronchial affection. **DOSE:** 1 Gm. (gr. xv). Preparations: effervescent citrate, 4 Gm. (dr. i); solution, 16 mils (fldr. iv).

POTASSIUM GLYCERINOPHOSPHATE.

Thick liquid or a mass. Soluble in water. Nerve tonic. **USES:** neurasthenia, phosphaturia, convalescence from influenza, deficient nerve nutrition, Addison's disease, etc. **DOSE:** 0.25-0.6 mil (℥ iv-x) 3 or 4 times daily in mixture. Injection, 0.2-0.25 mil (℥ iii-iv) once daily in water containing sodium chloride.

POTASSIUM HYDRATE. (Potassi Hydroxidum.) *Kali Cauticum Fusum.*

Caustic potassa; potassium hydroxide. Freely soluble in water and alcohol. Escharotic; antacid; diuretic. Uses: *internally*, lithiasis, gonorrhœa, acid dyspepsia, and cutaneous affection; *externally*, destroying warts, gangrenous tissue, etc. Dose: 0.015–0.06 Gm. (gr. $\frac{1}{4}$ –i). Preparation: solution, 1 mil (℥ xv).

POTASSIUM HYPOPHOSPHITE. (Potassii Hypophosphis.) Soluble in about 1 part of water. Nerve stimulant. Uses: phthisis, scrofula, deficient nerve power. Dose: 0.5 Gm. (gr. viii).**POTASSIUM IODIDE.** (Potassii Iodidum.) *Kalium Iodatum.* Soluble in about 1 part of water. Alterative; uric acid solvent; antisypilitic. Uses: *internally*, phthisis, rheumatism, pericarditis, syphilis, aneurisms, scrofulous swellings, lead poisoning, angina pectoris, asthma. Dose: 0.5 Gm. (gr. viii). Preparation: ointment (10 per cent.).**POTASSIUM NITRATE.** (Potassii Nitras.) *Kalium Nitricum.* Saltpetre; nitre. Soluble in about 4 parts of water, slightly soluble in alcohol. Antiseptic; refrigerant; diuretic; diaphoretic. Uses: fevers, dropsy, asthma, rheumatism, diseases of gastric and intestinal mucosa. Fumes of burning potassium nitrate paper also used in asthma. Dose: 0.5 Gm. (gr. viii).**POTASSIUM PERMANGANATE.** (Potassii Permanganas.) *Kalium Permanganicum.*

Soluble in about 18 parts of water, decomposed by alcohol. Disinfectant; deodorant, emmenagogue. Uses: morphine poisoning, diphtheria; also as 1:16 wash in diphtheria and scarlatina, and in carcinoma, foul ulcers, fetid breath, and perspiring feet. Dose: 0.065 Gm. (gr. i), in solution or pills made with kaolin and petrolatum, or with cacao butter, after meals.

POTASSIUM AND SODIUM TARTRATE. (Potassi et Sodii Tartras.) *Kalium Natrio-tartaricum.*

Rochelle salt. Soluble in about $1\frac{1}{2}$ parts of water, insoluble in alcohol. Purgative, refrigerant. Uses: constipation, headache, dropsy, rheumatism; preferred laxative in hemorrhoids. Dose: 8 Gm. (dr. ii).

PROTARGOL. P.

Proteid compound of silver; 8 per cent. silver. Yellow powder. Soluble in water. **USES:** chiefly gonorrhœa, and ophthalmia neonatorum. Applied in $\frac{1}{2}$ -2 per cent. solution.

PUMPKIN SEED. (Pepo.)

Anthelmintic. **DOSE:** 30 Gm. (dr. viii).

PYROGALLOL.—See Acid, Pyrogallic.**QUASSIA. (Quassia.) *Lignum Quassia.***

Bitter tonic; anthelmintic; antipyretic; antiparasitic. **USES:** to stimulate digestive organs and create appetite; chronic constipation; worms, fever, etc. **DOSE:** 0.5 Gm. (gr. viii). Preparations: tincture (20 per cent.), 2 mls (℥ xxx).

QUININE. (Quinina.) *Chininum.*

Soluble in about 6 parts of alcohol, 2000 parts of water. Antipyretic; antiperiodic; ecboic; tonic. **USES:** febrifuge in typhus and typhoid fever, remittent and intermittent fevers, malaria, amenorrhœa; to hasten labor, and as a general bitter tonic. The salts are usually prescribed. For hypodermic use the bisulphate, dihydrochlorate, or carbamidated hydrochlorate is to be preferred. **DOSE:** 0.25 Gm. (gr. iv). Injection, the salts mentioned below.

QUININE BISULPHATE. (Quininæ Bisulphas.)

Soluble in about 10 parts of water, 32 of alcohol; eligible for subcutaneous use. Nasal injection (in hay fever): 0.2 per cent. aqueous solution. **DOSE:** as of quinine.

QUININE SULPHATE. (Quininæ Sulphas.) *Chininum Sulphuricum.*

Soluble in about 740 parts of water, 65 of alcohol. **DOSE:** as of quinine.

QUININE TANNATE. (Quininæ Tannas.) *Chininum Tannicum.*

Light brown insoluble powder. Used chiefly for children. **DOSE:** (for children) 0.3-1 Gm. (gr. v-xv) with chocolate in powder or tablets.

QUININE AND UREA HYDROCHLORATE. (*Quininae et Ureæ Hydrochloridum.*)

Carbamidated quinine dihydrochlorate. Colorless crystals. Soluble freely in water or alcohol. Used by injection: 0.12-0.5 Gm. (gr. ii-viii) in malaria. Also injected in solution to produce local anaesthesia.

RESIN, JALAP. (*Resina Jalapæ.*)

Heavy jalap resin. Soluble in alcohol. Hydragogue cathartic. **USES:** chronic constipation, dropsy, etc.; usually with other remedies. **DOSE:** 0.125 Gm. (gr. ii).

RESIN, PODOPHYLLUM.—See *Podophyllum*.**RESIN, SCAMMONY.** (*Resina Scammonia.*)

Hydragogue cathartic. **USES:** with other cathartics to increase their energy. **DOSE:** 0.2 Gm. (gr. iii).

RESINOL. P.

Unguentum resinol. Antipruritic; antiphlogistic. *Externally*, pure, night and morning.

RESORCIN. (*Resorcinol.*) *Resorcinum.*

Resorcinol. White crystals; reddish on exposure; unpleasant sweet taste. Soluble in about 1 part of alcohol, and 1 part of water. Antiseptic; antipyretic; anti-emetic. **USES:** *internally*, in vomiting, sea-sickness, dyspepsia, cholera infantum, diarrhoea, and diphtheria. **DOSE:** 0.125 Gm. (gr. ii).

RHUBARB. (*Rheum.*) *Rhizoma Rhei.*

Cathartic; astringent; tonic; stomachic. **USES:** diarrhoea, constipation, hepatic disease and to promote appetite. **DOSE:** 1 Gm. (gr. xv). Preparations: extract, 0.25 Gm. (gr. iv); fluidextract, 1 mil (℥ xv); tincture (20 per cent.), 4 mils (fldr. i); syrup, 8 mils (fldr. ii); aromatic tincture (20 per cent.), 2 mils (℥ xxx); aromatic syrup, 8 mils (fldr. ii); mixture of rhubarb and soda, 4 mils (fldr. i); compound powder, 2 Gm. (gr. xxx); compound rhubarb pill, 2 pills.

ROCHELLE SALT.—See Potassium and Sodium Tartrate.**RUBUS.** (*Rubus.*)

Blackberry. Astringent; tonic. **USES:** diarrhoea, dysentery, etc.

DOSE: 1 Gm. (gr. xv). Preparations: fluidextract, 1 mil (℥ xv); syrup, 4 mils (fldr. i).

SACCHARIN. (Benzosulphinidum.) *Saccharinum.*

Garantose; glucoside. White powder fully 550 times as sweet as cane-sugar. Soluble in about 30 parts of alcohol, 400 parts of water. USES: to sweeten the food of diabetics and dyspeptics; to cover taste of bitter and acrid medicines. Gr. $\frac{1}{4}$ tablet corresponds to about 2 lumps of sugar.

SALICIN. (Salicinum.)

Soluble in about 30 parts of water, 60 of alcohol. Tonic, antiperiodic; antirheumatic. USES: rheumatism, malaria, puerperal fever, chorea, etc. DOSE: 1 Gm. (gr. xv).

SALOL. (Phenylis Salicylas.) *Salolum.*

Phenyl salicylate. Almost insoluble in water. Antiseptic; antipyretic; antirheumatic, etc. USES: internally, typhoid fever, diarrhoea, dysentery, fermentative dyspepsia, rheumatism, grip and cystitis; coating for enteric pills, such pills being taken one hour or more after meals and no oil with them. DOSE: 0.5 Gm. (gr. viii).

SALOPHEN. P.

Acetylparamidophenol salicylate. White, odorless, tasteless leaflets or powder; 51 per cent. salicylic acid. Soluble in alcohol, insoluble in water. Antirheumatic; antiseptic; antipyretic; analgesic. USES: rheumatism, gout, chorea; *externally*, in psoriasis and other itching skin diseases, as 1:10 ointment. DOSE: 0.3-1 Gm. (gr. v-xv); maximum dose, 1.3 Gm. (gr. xx), single; 6 Gm. dr. $1\frac{1}{2}$) daily.

SALT, EPSOM.—See Magnesium Sulphate.

SALT, GLAUBER'S.—See Sodium Sulphate.

SALT, ROCHELLE.—See Potassium and Sodium Tartrate.

SALTPETRE.—See Potassium Nitrate.

SALVARSAN. P. Ehrlich's 606.

An organic substitution compound of arsenic. It occurs as a sulphur-yellow powder marketed in small sealed glass tubes,

which is soluble in water but may be rendered more soluble by the addition of an alkali. **USES:** Has a specific action on the parasite of syphilis and causes a rapid disappearance of the symptoms of the disease, especially in the early stages. An apparent cure results, which may be followed by a relapse unless further treatments and mercurial medication are given. **DOSE:** 0.6 Gm. given intramuscularly in oil or solution, or intravenously in solution.

SANGUINARIA. (*Sanguinaria*.)

Bloodroot. Expectorant; emetic. **USES:** chiefly in cough mixtures as expectorant. **DOSE:** 0.125 Gm. (gr. ii). Preparations: fluidextract, 0.1 mil (℥ ii); tincture (10 per cent.), 1 mil (℥ xv).

SANTONIN. (*Santoninum*.)

Anhydrous santoninic acid. Soluble in about 40 parts of alcohol, insoluble in water. Anthelmintic; tonic. **USES:** worms. **DOSE:** 0.065 Gm. (gr. i). Preparation: troches, containing 0.03 Gm. (gr. ½).

SARSAPARILLA. (*Sarsaparilla*.) *Radix Sarsaparilla*.

Alterative; tonic. **USES:** in syphilis, scrofula, rheumatism, and skin diseases. Usually with mercury and potassium iodide. **DOSE:** 2 Gm. (gr. xxx). Preparations: fluidextract, 2 mils (℥ xxx); compound fluidextract, 2 mils (℥ xxx); compound syrup, 16 mils (fldr. iv).

SCAMMONY. (*Scammoniae Radix*.)

Hydragogue cathartic. **USES:** with other cathartics to increase their power. **DOSE:** 0.25 Gm. (gr. iv). Preparations: resin, 0.2 Gm. (gr. iii).

SCARLET RED.

An analine stain used in 8 per cent. ointment to stimulate granulations. **USES:** In ulcers and burns, etc. Not used internally.

SCOPARIUS.

Broom. Diuretic; purgative. **USES:** dropsy. **DOSE:** 1 Gm. (gr. xv).

SCOPOLAMINE HYDROBROMIDE.—See Hyoscin Hydrobromide.

SENEGA. (Senega.) *Radix Senegæ.*

Expectorant; diuretic; alterative; sedative. **USES:** coughs, colds, catarrhal affections, croup, dropsy, rheumatism, asthma, etc. **DOSE:** 1 Gm. (gr. xv). **Preparations:** fluidextract, 1 mil (℥ xx); syrup, 4 mils (fldr. i).

SENNA. (Senna.)

Cathartic. **USES:** constipation and febrile diseases. **DOSE:** 4 Gm. (dr. i). **Preparations:** fluidextract, 2 mils (℥ xxx); syrup, 4 mils (fldr. i); compound infusion, 120 mils (flox. iv); compound licorice powder, 4 Gm. (dr. i).

SILVER NITRATE. (Argenti Nitras.) *Nitras Argenticus.*

Soluble in about 1 part of water, 26 of alcohol. Antiseptic; alterative; stimulant; escharotic; irritant. **USES:** *internally*, chronic diarrhœa, subacute gastritis, gastric ulcer, intestinal affections; *externally*, in 2 per cent. solution in gonorrhœa; caustic for ulcers, warts, etc.: ophthalmic practice; odontalgia; external hemorrhoids, etc. **DOSE:** 0.01 Gm. (gr. $\frac{1}{6}$). **Preparations:** fused nitrate in form of pencils; mitigated silver nitrate.

SILVER NITRATE (Molded).—See Silver Nitrate.

SILVER NITRATE (Diluted).—See Silver Nitrate.

SODIUM ACETATE. (Sodii Acetas.) *Natricum Aceticum.*

Soluble in about 2 parts of water, 30 of alcohol. **USES:** cystitis, dropsy, and diseases of the urinary organs. **DOSE:** 1.0 Gm. (gr. xv)...

SODIUM ARSENATE. (Sodii Arsenas.) *Natrium Arsenicum.*

Soluble in about 4 parts of water, slightly soluble in alcohol. Alterative; tonic; antiseptic; antiperiodic. **USES:** *internally*, malaria, debility, anæmia, chorea, nervous diseases; also in cigarettes for asthma and phthisis; *externally*, in baths for rheumatism and gout. **DOSE:** 0.005 Gm. (gr. $\frac{1}{12}$). **Preparations:** dried drug, 0.003 Gm. (gr. $\frac{1}{20}$); solution 0.2 mil (℥ iii).

SODIUM BENZOATE. (Sodii Benzoas.) *Natrium Benzoicum.*

Soluble in about 2 parts of water, 45 of alcohol. Antirheumatic; antipyretic; antiseptic. **USES:** rheumatism, gout, uræmia, cystitis, lithæmia, tonsillitis, colds, etc. **DOSE:** 1 Gm. (gr. xv).

SODIUM BICARBONATE. (Sodii Bicarbonas.) *Natrium Bicarbonicum.*

Soluble in about 12 parts of water, insoluble in alcohol. Antacid; antiseptic. **USES:** acid stomach, lithiasis, cystitis, etc. **DOSE:** 1 Gm. (gr. xv). **Preparation:** troches.

SODIUM BORATE. (Sodii Boras.) *Borax.*

Borax; so-called sodium biborate or tetraborate. Soluble in about 25 parts of water, insoluble in alcohol. Antiseptic; emmenagogue. **USES:** *internally*, amenorrhœa, dysmenorrhœa; *externally*, sore mouth, conjunctivitis, urethritis, skin diseases, aphthæ, etc. **DOSE:** 0.5 Gm. (gr. viii).

SODIUM BROMIDE. (Sodii Bromidum.) *Natrium Bromatum.*

Soluble in about 2 parts of water, 16 of alcohol. Sedative; mild hypnotic. **USES:** epilepsy, headache, hysteria, nymphomania, satyriasis, delirium tremens, insomnia, scrofula, nervousness. Less depressing than potassium bromide. **DOSE:** 1 Gm. (gr. xv).

SODIUM CACODYLATE. (Sodii Cacodylas.)

Sodium dimethylarsenate. White powder. Soluble in water. Alterative; hæmatinic like arsenous acid. **USES:** chiefly obstinate psoriasis, pseudoleukæmia, diabetes, anæmia, chlorosis, chorea, Basedow's disease, tuberculosis. **DOSE:** 0.06-0.12 Gm. (gr. i-ii).

SODIUM CITRATE. (Sodii Citras.)

White powder. Freely soluble in water, slightly soluble in alcohol. Diuretic; antilithic; refrigerant. **USES:** gout, cystitis, rheumatism, fevers, etc. **DOSE:** 1 Gm. (gr. xv).

SODIUM GLYCERINOPHOSPHATE. (Sodii Glycerophosphas.)

Thick liquid or mass. Soluble in water. Reconstructive. **USES:** Deficient nerve nutrition, neurasthenia phosphaturia, convalescence from influenza, exophthalmic goitre, Addison's disease, lumbago, etc. **DOSE:** 0.25-0.6 Gm. (gr. iv-x), 3 or 4 times daily.

SODIUM HYDRATE. (Sodii Hydroxidum.) *Natrium Cauticum.*

Sodium hydroxide; caustic soda. Freely soluble in water or alcohol. Caustic; antacid. **DOSE:** 0.03-0.6 Gm. (gr. ½-1) freely diluted. **Preparation:** solution: 1 mil (℥ xv).

SODIUM HYPOPHOSPHITE. (Sodii Hypophosphis.)

Soluble in about 1 part of water, 30 of alcohol. Tonic; alterative. **USES:** Phthisis, scrofula, defects in bony structure, and wasting diseases. **DOSE:** 1 Gm. (gr. xv). **Preparations:** syrup, 8 mils (fldr. ii); compound syrup, 8 mils (fldr. ii).

SODIUM HYPOSULPHITE.—See Sodium Thiosulphate.**SODIUM NITRITE.** (Sodii Nitris.) *Natrium Nitrosum.*

White crystals or sticks; mildly saline taste. Soluble in about 2 parts of water; slightly soluble in alcohol. Antispasmodic, diaphoretic, diuretic. **USES:** angina pectoris, dropsy, and diseases of the genito-urinary organs. **DOSE:** 0.065 Gm. (gr. i).

SODIUM PERBORATE. (Sodii Perboras.)

White powder, soluble in water. Antiseptic, germicide. **USES:** same as hydrogen dioxide. **DOSE:** 0.06 Gm. (1 grain).

SODIUM PHOSPHATE. (Sodii Phosphas.) *Natrium Phosphoricum.*

Colorless crystals. Soluble in about 6 parts of water, insoluble in alcohol. Cathartic; antilithic. **USES:** mild laxative and in vesical calculi. **DOSE:** 2 Gm. (gr. xxx). **Preparations:** dried sodium phosphate, 1 Gm. (gr. xv); effervescent, 8 Gm. (dr. ii); compound solution, 8 mils (fldr. ii).

SODIUM SALICYLATE. (Sodii Salicylas.) *Natrium Salicylicum.*

Soluble in about 1 part of water, 6 of alcohol. Antirheumatic, antiseptic; antipyretic. **USES:** rheumatism, neuralgia, pleurisy, chorea, pericarditis, migraine, etc. **DOSE:** 1 Gm. (gr. xv); maximum dose, 4 Gm. (dr. i).

SODIUM SULPHATE. (Sodii Sulphas.) *Natrium Sulfuricum.*

Glauber's salt. Soluble in about 3 parts of water, insoluble in alcohol. Cathartic; aperient; diuretic. **USES:** constipation, dropsy, torpid liver, cystitis. **DOSE:** 16 Gm. (dr. iv).

SODIUM THIOSULPHATE. (Sodii Thiosulphas.) *Natrium Thiosulphuricum.*

Sodium hyposulphite. Soluble in about 1 part of water, insoluble in alcohol. Antiseptic; germicide. **USES:** parasitic skin

disease, sore mouth, diarrhœa, flatulent dyspepsia, etc. **DOSE:** 0.3–1.3 Gm. (gr. v–xx).

SOLUTION OF ALUM ACETATE. (Liquor Aluminii Acetatis.) Burrows' Solution.

Astringent, antiseptic, and disinfectant solution. Used locally in full strength (4.5 to 5.5 per cent.) or diluted.

SOLUTION, AMMONIUM ACETATE. (Liquor Ammonii Acetatis.) *Ammonium Aceticum Solutum.*

Spirit Mindererus. Diaphoretic; antipyretic; diuretic. **USES:** fevers, dysmenorrhœa, mumps, scarlatina, etc. **DOSE:** 16 mils (fldr. iv).

SOLUTION, ANTISEPTIC. (Liquor Antisepticus.)

A preparation similar to Listerine.

SOLUTION, ARSENIC AND MERCURIC IODIDE.—See Mercuric Iodide, Red.

SOLUTION, CALCIUM HYDRATE. (Liquor Calcis.) *Liquor Calcaria.*

Lime water. Antacid; astringent. **USES:** sour stomach, diarrhœa, dysentery, diabetes, vomiting, dyspepsia; also *externally* as liniment (with linseed or other oil) for burns, etc. **DOSE:** 16 mils (fldr. iv). Preparation: liniment.

SOLUTION, DAKIN-CARREL.—See pages 126, 263.

SOLUTION, DOBELLS. (Liquor Sodii Boratis Compositus.)

An alkaline gargle and mouth-wash, containing sodium bicarbonate (1.5), sodium borate (1.5), carbolic acid (0.3), glycerin (3.5), and water (to make 100).

SOLUTION, DONOVAN'S.—See Solution, Arsenic and Mercuric Iodides.

SOLUTION, FOWLER'S. (Liquor Potassi Arsenitis.)

Solution of potassium arsenite. Alterative; antiperiodic; tonic. **USES:** chorea, skin disease; intermittent fever, malarial affections, periodic neuralgia, chronic rheumatism, etc. Never give on an empty stomach. **DOSE:** 0.2 mil (℥ iii).

SOLUTION, HYDROGEN PEROXIDE. (Liquor Hydrogenii Dioxidi.) *Hydrogenium Hyperoxidatum Solutum.*
3 per cent H_2O_2 (10 volumes available O). For action and uses see Perhydrol.

SOLUTION, IODINE, COMPOUND.—See Iodine. (Liquor Iodi Compositus.)

SOLUTION, IRON AND AMMONIUM ACETATE. (Liquor Ferri et Ammonii Acetatis.)

Basham's mixture. Hæmatinic; astringent. Dose: 16 mls (fldr. iv).

SOLUTION, LEAD SUBACETATE. (Liquor Plumbi Subacetatis.) *Plumbum Subacetaticum Solutum.*

Goulard's acetate. 25 per cent. Astringent; antiseptic. Used chiefly to make diluted solution (lead water) and cerate (20 per cent.) for application to burns, sprains, bruises, and for use in eye washes, and for erysipelas, gonorrhœa, etc.

SOLUTION, MAGNESIUM CITRATE.

Laxative; refrigerant. Dose: 360 mls (flox. xii).

SOLUTION, LUGOL'S.—See Solution of Iodine Compound.

SOLUTION, POTASSIUM ARSENITE.—See Fowler's Solution.

SOLUTION, POTASSIUM HYDRATE.—See Potassium Hydrate.

SOLUTION, SALT.—See Solution, Sodium Chloride, Physiological.

SOLUTION, SODA, CHLORINATED. (Liquor Soda Chlorinatæ.)

Labarraque's solution. 2.6 per cent. available chlorine. Disinfectant; antizymotic. Uses: malignant scarlatina, typhoid fever, putrid sore throat, glandular enlargements. Dose: 1 mil (℥ xv).

SOLUTION, SODIUM ARSENATE.—See Sodium Arsenate.

SOLUTION, SODIUM CHLORIDE, PHYSIOLOGICAL. (Liquor Sodii Chloridi Physiologicus.)

Normal salt solution. Sodium chloride (0.85) in distilled water (to make 100).

SOLUTION, SODIUM HYDRATE.—See Sodium Hydrate.

SPARTEINE SULPHATE. (Sparteinae Sulphas.) *Sparteinum Sulfuricum.*

Soluble in water or alcohol. Diuretic; heart remedy. **USES:** *internally*, where digitalis fails or is contra-indicated. **DOSE:** 0.01 Gm. (gr. $\frac{1}{60}$).

SPEARMINT. (Mentha Viridis.)

Carminative; stimulant. **USES:** flatulence, colic, dysentery, rheumatism, neuralgia, etc. **DOSE:** 4 Gm. (dr. i). **Preparations:** water, 10 mils (fldr. iv); spirit, 2 mils (℥ xxx).

SPIGELIA. (Spigelia.)

Pinkroot. Anthelmintic. **DOSE:** 4 Gm. (dr. i). **Preparation:** fluidextract, 4 mils (fldr. i).

SPIRIT, GLONONIN. (Spiritus Glycerylis Nitratis.)

Spirit (solution) of nitroglycerin (trinitrin) 1 per cent. Antispasmodic; vasodilator; arterial stimulant. **USES:** angina pectoris, convulsions, asthma, heart disease, poisoning by carburetted hydrogen, headache, neuralgia, etc. **DOSE:** 0.05 mil (℥ i).

SPIRIT, MINDERERUS.—See Solution, Ammonium Acetate.

SPIRIT, NITROUS ETHER. (Spiritus Ætheris Nitrosi.)

Sweet spirit of nitre. Diaphoretic; diuretic; antipyretic; stimulant; antispasmodic. **USES:** fevers, dropsy, diseases of the genito-urinary organs, flatulent colic, colds, etc. **DOSE:** 2 mils (℥ xxx).

SQUILL. (Scilla.) *Bulbus Scilla.*

Expectorant; emetic; diuretic. **USES:** coughs, colds, croup, dropsy. **DOSE:** 0.125 Gm. (gr. ii). **Preparations:** fluidextract, 0.1 Gm. (gr. xv); tincture (10 per cent.), 1 mil (℥ xv); vinegar, 1 mil (℥ xv); syrup, 2 mils (℥ xxx); compound syrup, 2 mils (℥ xxx).

STAPHISAGRIA. (Staphisagria.)

Stavesacre. Parasiticide. **USES:** *externally* in substance or 1:10 solution of fluidextract in dilute acetic acid in itch, and for pediculi. **Preparation:** fluidextract.

STILLINGIA. (*Stillingia*.)

Queen's root. Alterative; resolvent. **USES:** syphilis, skin diseases, scrofula, etc. **DOSE:** 2 Gm. (℥ xxx). **Preparation:** fluid-extract, 2 mls (℥ xxx).

STRAMONIUM. (*Stramonium*.) *Folium Stramonii*.

Narcotic; sedative; analgesic. **USES:** *internally*, epilepsy, rheumatism, dysmenorrhœa, spasmodic asthma, chorea; *externally*, as ointment in ulcers and hemorrhoids; also in cigarettes in asthma. **DOSE:** 0.065 Gm. (gr. i). **Preparations:** extract, 0.01 Gm. (gr. $\frac{1}{60}$); fluidextract, 0.05 mil (℥ i); tincture (10 per cent.), 0.5 mil (℥ viii); ointment.

STRONTIUM BROMIDE. (*Strontii Bromidum*.)

Colorless, odorless, deliquescent crystals; bitter saline taste. Soluble in about 2 parts of water, freely in alcohol. Gastric tonic; nerve sedative; antiepileptic. **USES:** hyperacidity of stomach, gout, epilepsy, nervousness, hysteria, headache, etc. **DOSE:** 1 Gm. (gr. xv).

STRONTIUM SALICYLATE. (*Strontii Salicylas*.)

Soluble in about 55 parts of water, soluble in alcohol. Antirheumatic; intestinal antiseptic. **USES:** *rheumatism*, chorea, muscular pains, pleurisy, intestinal fermentation. **DOSE:** 1 Gm. (gr. xv).

STROPHANTHIN. (*Strophanthinum*.)

White powder, very bitter taste. Soluble in water or alcohol. Heart tonic; vasoconstrictor; non-diuretic. **USE:** see Digitalin. **DOSE:** 0.0005–0.001 Gm. (gr. $\frac{1}{120}$ – $\frac{1}{60}$) by mouth; 0.0008 Gm. (gr. $\frac{1}{80}$) intravenously.

STROPHANTHUS. (*Strophanthus*.) *Semen Strophanthi*.

ACTION AND USES: as strophanthin. **DOSE:** 0.065 Gm. (gr. i). **Preparation:** tincture (10 per cent.), 0.5 mil (℥ viii).

STRYCHNINE. (*Strychnina*.) *Strychninum*.

Soluble in 110 parts of water, 6700 of alcohol. Bitter tonic; stimulant; stomachic. **USES:** *internally*, palsy, chronic alcoholism, dyspepsia, anæmia, insomnia from mental overwork, etc. **DOSE:** 0.001 Gm. (gr. $\frac{1}{60}$).

STRYCHNINE NITRATE. (Strychninæ Nitras.) *Strychninum Nitricum.*

White needles or powder. Soluble in about 50 parts of water, 60 of alcohol. **USES:** DOSE, etc.: as of strychnine. Most frequently used in dipsomania.

STRYCHNINE SULPHATE. (Strychninæ Sulphas.)

Soluble in about 50 parts of water, 110 of alcohol. **USES:** DOSE, etc.: as of strychnine.

STYPTICIN. P. (Cotarninæ Hydrochloridum.)

Cotarnine hydrochlorate. Yellow powder. Soluble in water or alcohol. Hæmostatic; uterine sedative; styptic. **USES:** highly extolled in atypical uterine hemorrhages not dependent upon neoplasms or retained fragments of ovum or upon marked endometritis. Reported excellent also in prolonged or excessive menstruation, particularly in young girls, as effective in purely climateric hemorrhages, dysmenorrhœa, and hæmoptysis; also to be efficacious in nose-bleed and in hemorrhage following tooth extraction. **DOSE:** 0.1–0.25 Gm. (gr. 1½–iv) 4 or 5 times daily.

SULFONAL. (Sulphon methanum.) *Sulfonalum.*

Colorless tasteless crystals. Soluble in about 500 parts of water, 110 of dilute alcohol. Hypnotic; sedative. **USES:** insomnia, epilepsy, night-sweats, hiccough, chordee, etc. **DOSE:** 1 Gm. (gr. xv).

SULPHUR, PRECIPITATED. (Sulphur Præcipitatum.)

Lac sulphuris; milk of sulphur. Laxative; alterative; antiseptic; diaphoretic. **USES:** *internally*, rheumatism, catarrh, asthma, hemorrhoids, sciatica, skin diseases; *externally*, in ointment, in scabies, and other skin affections. **DOSE:** 4 Gm. (dr. i).

SULPHUR, SUBLIMED. (Sulphur Sublimatum.)

Flowers of sulphur. Intended for external use only in scabies, skin diseases, etc. Preparation: ointment (15 per cent.).

SULPHUR, WASHED. (Sulphur Lotum.) *Sulfur Depuratum.*

ACTION AND USES: as sulphur, pure. **DOSE:** 4 Gm. (dr. i).

SUPRARENAL CAPSULE, DRIED. (Suprarenalum Siccum.)

1 part represents 5 parts fresh capsule. Alterative; nervine.

USES: Addison's disease, diabetes insipidus, neurasthenia, rha-chitis, cyclic albuminuria, climacteric disturbances, etc. DOSE: 0.25 Gm. (gr. iv).

SYRUP, HYDRIODIC ACID.—See Acid, Hydriodic.

SYRUP, HYPOPHOSPHITES.—See Sodium Hypophosphite.

SYRUP, IRON IODIDE. (Syrupus Ferri Iodidi.) *Syrupus Jodeti Ferrosi, Ferri Iodidi Sirupus.*

10 per cent. ferrous iodide. Alterative; hæmatinic. USES: scrofulous affections, tuberculosis, chronic rheumatism, leuco-cythæmia, chlorosis, anæmia. DOSE: 1 mil (℥ xv).

TAKA DIASTASE. P.

(Diastase takamine.) Brownish powder; almost tasteless. Soluble in water, insoluble in alcohol. Starch digestant (1 part stated to convert over 100 parts of dry starch). USES: in amylaceous dyspepsia. DOSE: 0.06–0.3 Gm. (gr. i–v).

TANNALBIN. P.

Tannin albuminate exsiccated, Knoll. Light brown, odorless, tasteless powder; 50 per cent. tannin. Insoluble in water. DOSE: 1–4 Gm. (dr. ¼–1).

TANNIGEN. P.

Diacetyl tannin. Gray, hygroscopic powder; almost odorless and tasteless. Soluble in alkaline fluids or alcohol, insoluble in water. Intestinal astringent. DOSE: 0.3–2 Gm. (gr. v–xxx).

TANNOFORM. P.

Tannin formaldehyde. Loose, reddish powder. Soluble in alcohol, insoluble in water. Siccative antiseptic and deodorant. USES: hyperidrosis, bromidrosis, weeping eczema, ozena, etc. Applied pure or in 25–50 per cent. triturations.

TAR. (Pix Liquida.) *Pix Pini.*

Antiseptic; antispasmodic. USES: *internally*, bronchial affec-tions, colds, fevers, diarrhœa, etc.; *externally*, skin diseases. DOSE: 0.5 Gm. (gr. viii). Preparations: syrup, 4 mils (fldr. i); ointment (50 per cent.).

TARAXACUM. (*Taraxacum*.)

Dandelion. Bitter tonic; hepatic stimulant. **USES:** liver disease with dyspepsia, and constipation. **DOSE:** 8 Gm. (dr. ii). **Preparations:** extract, 1 Gm. (gr. xv); fluidextract, 8 mils (fldr. ii).

TARTAR EMETIC.—See Antimony and Potassium Tartrate.

TEREBENE. (*Terebenum*.)

Colorless or slightly yellowish liquid; thyme-like odor; resinifies in light. Soluble in alcohol, slightly soluble in water. **Expectorant; antiseptic; antifermentative.** **USES:** *internally*, in chronic bronchitis, flatulent dyspepsia, genito-urinary diseases, phthisis, bronchitis, etc.; *externally*, skin diseases; in phthisis by inhalation (about 2 oz. a week). **DOSE:** 0.25–1.3 Gm. (gr. iv–xx), **externally**, in 1 per cent. solution.

TERPIN HYDRATE. (*Terpini Hydras*.) *Terpinum Hydratum*.

Colorless prisms; slightly bitter taste. Soluble in about 10 parts of alcohol, 250 of water. **Expectorant; antiseptic; diuretic; diaphoretic.** **USES:** bronchial affections, whooping-cough, throat affections, tuberculosis. **DOSE:** 0.125 Gm. (gr. ii).

THEINE.—See Caffeine.

THEOBROMINE.

White powder; bitter taste. Insoluble in water. **Diuretic; nerve stimulant.** **USES:** cardiac dropsy. **DOSE:** 0.3–1 Gm. (gr. v–xv.)

THEOBROMINE AND SODIUM SALICYLATE. (*Theobrominæ Sodio-Salicylate*.)

White odorless powder; decomposed by exposure. **Diuretic.** **USES:** cardiac dropsy; nephritis, especially after scarlatina. **DOSE:** 1 Gm. (gr. xv), 5 or 6 times daily.

THEOCIN. P.

Theophyllin. Colorless crystals. Soluble with difficulty in cold water and alcohol. **Diuretic.** **DOSE:** 0.2–0.5 Gm. (gr. iii–viii).

THYROIDIN. P.

Dried extract of sheep's thyroid; 1 part represents 6 parts of fresh gland. Whitish powder. **Alterative, antifat.** **USES:** myxœdema, cretinism, psoriasis, obesity, etc. **DOSE:** 0.25 Gm. (gr. iv).

TINCTURE, ACONITE.—See Aconite.

TINCTURE, ARNICA FLOWERS. (*Tinctura Arnicæ.*)

Antiseptic. *USES:* *externally*, chiefly in bruises and other injuries.

TINCTURE, HYDRASTIS.—See Hydrastis.

TINCTURE, HYOSCYAMUS.—See Hyoscyamus.

TINCTURE, IRON CHLORIDE. (*Tinctura Ferri Chloridi.*)

Solutio Chloreti Ferrici Spirituosa.

Hæmatinic; astringent. *USES:* chlorosis, anæmia, etc. *DOSE:* 0.5 Gm. (gr. viii).

TINCTURE, NUX VOMICA.—See Nux Vomica.

TINCTURE, PULSATILLA.

Antispasmodic; sedative; anodyne. *USES:* *internally*, asthma, whooping-cough, spasmodic dysmenorrhœa, orchitis, etc. *DOSE:* 0.3–1.3 mls (℥ v–xv).

TINCTURE, STRAMONIUM.—See Stramonium.

TINCTURE, STROPHANTHUS.—See Strophanthus.

TINCTURE, VERATRUM VIRIDE.—See Veratrum Viride.

TRIKRESOL. P.

Clear liquid; cresolic odor. Soluble in 40 parts of water. Disinfectant. Application: in ½–1 per cent. solution.

TRIONAL. P.

Diethylsulphonemethylethylmethane. White powder; faint bitter taste. Soluble in about 320 parts of water. Hypnotic; sedative. *USES:* for producing sleep, especially where there is no pain. *DOSE:* 1 Gm. (gr. xv).

TRITICUM. (*Triticum.*)

Couch-grass. Demulcent; diuretic. *USES:* cystitis and other diseases of the genito-urinary organs. *DOSE:* 8 Gm. (dr. ii). Preparation: fluidextract, 8 mls (fldr. ii).

URETHANE. (*Æthylis Carbamas.*)

Ethyl urethane: ethyl carbamate. Colorless crystals; faint

peculiar odor; saltpetre like taste. Soluble in about 1 part of alcohol or water. Hypnotic; antispasmodic; sedative. **USES:** insomnia, eclampsia, nervous excitement, tetanus; and as antidote in strychnine, resorcin, or picrotoxin poisoning. In eclampsia it should be given per enema. **DOSE:** 2-3 Gm. (dr. $\frac{1}{2}$ - $\frac{3}{4}$).

VALERIAN. (Valeriana.)

Nerve sedative; antispasmodic; anodyne. **USES:** hysteria, epilepsy, hypochondria, headache, etc. **DOSE:** 2 Gm. (gr. xxx). Preparations: tincture (20 per cent.), 4 mils (fldr. i); ammoniated tincture, 2 mils (℥ xxx).

VERATRUM VIRIDE. (Veratrum Viride.)

American hellebore. Cardiac depressant; diaphoretic; diuretic. **USES:** fevers, acute inflammations as pneumonia, mania, puerperal convulsions, etc. **DOSE:** 0.002 Gm. (gr. $\frac{1}{30}$). Preparations: oleate; ointment.

VERONAL. P.

Diethylmalomylurea. White crystalline powder; faintly bitter taste. Soluble in about 12 parts of boiling water. Hypnotic. **USES:** simple agrypnia, and in insomnia accompanying hysteria, neurasthenia, and mental disturbances. **DOSE:** 0.3-1 Gm. (gr. v-xv).

VIBURNUM COMPOUND. P.

Antispasmodic; nervine. **USES:** dysmenorrhœa, menorrhagia, metrorrhagia. **DOSE:** 4-8 mils (fldr. i-ii).

VIBURNUM PRUNIFOLIUM.—See Black Haw.

WHITE PRECIPITATE.—See Mercury-ammoniated.

WILD CHERRY BARK. (Prunus Virginiana.)

Astringent; tonic; sedative. **USES:** bronchitis, general or local irritation, debility, coughs, colds, etc. **DOSE:** 2 Gm. (gr. xxx). Preparations: syrup, 4 mils (fldr. i).

ZINC CARBONATE, PRECIPITATED. (Zinci Carbonas Præcipitatus.)

USES: Wounds, ulcers, skin diseases, etc., also face powder; externally, pure or in 20 per cent. ointment or powder.

ZINC CHLORIDE. (Zinci Chloridum.) *Zincum Chloratum.*

Soluble in about $\frac{1}{2}$ part of water, 1 part of alcohol. Alterative; antispasmodic; escharotic. *USES:* *internally*, epilepsy, chorea, scrofula, syphilis, etc.; *externally* caustic in nævi, cancerous affections, superabundant granulations, aneurisms, etc. *DOSE:* 0.006 Gm. (gr. $\frac{1}{10}$).

ZINC OXIDE. (Zinci Oxidum.) *Zincum Oxidatum.*

Antispasmodic; antiseptic; mild sedative. *USES:* *internally*, chorea, epilepsy, chronic diarrhœa, etc.; *externally* (in 5-20 per cent. solution), wounds, skin diseases, etc. *DOSE:* 0.25 Gm. (gr. iv). *Preparation:* ointment.

ZINC STEARATE. (Zinci Stearas.)

White agglutinating powder; turns darker on exposure. Insoluble in water. Antiseptic; astringent. *USES:* gonorrhœa, atrophic rhinitis, etc. Applied in substance or combined in form of the official ointment.

ZINC SULPHATE. (Zinci Sulphas.) *Zincum Sulfuricum.*

White vitriol; zinc vitriol. Soluble in about 1 part of water; insoluble in alcohol. Emetic; astringent; antiseptic; escharotic. *USES:* *internally*, gastric catarrh, nervous affections, night-sweats, etc.; *externally*, in gonorrhœa ($\frac{1}{2}$ -2 per cent. solution); ophthalmia (1:1000), skin diseases (1:10-1:20 ointment). *DOSE:* 1 Gm. (gr. xv) as emetic.

ZINC SULPHOCARBOLATE. (Zinci Phenolsulphonas.)

Colorless crystals. Soluble in about 5 parts of water or alcohol. Antiseptic; astringent. *USES:* gonorrhœa, foul ulcers, etc.; *internally*, typhoid, fermentative diarrhœa, etc. *DOSE:* 0.125 Gm. (gr. ii).

ZINC VALERIANATE. (Zinci Valeras.) *Zincum Valerianicum.*

Decomposes on exposure. Soluble in about 40 parts of alcohol, 120 of water. Antispasmodic; tonic. *USES:* diabetes insipidus, nervous affections, neuralgia, etc. *DOSE:* 0.125 Gm. (gr. ii).

SYNOPSIS OF THE PRINCIPAL ACTIONS AND USES OF DRUGS

I. DRUGS APPLIED TO SKIN OR MUCOUS MEMBRANE FOR LOCAL ACTION :

- (a) *Astringents* (the soluble salts being also styptics and acting through their power to coagulate protein) :

Tannic acid and compounds.

Iron preparations.

Bismuth preparations.

Lead acetate.

Zinc sulphate.

Copper sulphate.

Alum.

To contract vessels and reduce hemorrhage and swelling :

Cocaine and suprarenalin.

- (b) *Protectives* (forming protective layers) :

Plasters, collodia, starch, talc, etc.

- (c) *Local anodynes for pain and itching :*

Bicarbonate potassium.

Acting on terminals of sensory nerves.

Cocaine, eucaïne, orthoform.

Carbolic acid.

Chloretone.

Atropine, veratrine and aconite.

- (d) *Local anesthetics* (same action as local anodynes) :

Cocaine and eucaïne.

Orthoform.

II. TO AFFECT ALIMENTARY TRACT :

Mouth and Throat :

To lessen local inflammation :

Chlorates, ammonium chloride, cubebs.

To lessen salivation, by action on nerve terminals :

Atropine.

Stomach :

- (a) *Digestives :*

Pepsin, papaine, etc., hydrochloric acid (act on contents of stomach causing digestion of proteins).

(b) *Emetics:*

By peripheral irritation of stomach membranes:

Common salt, mustard, warm water, ipecac, copper and zinc sulphates.

By central action on vomiting centre:

Apomorphine

(c) *To lessen local irritation and vomiting by acting on terminations of sensory nerves in stomach:*

Opium, chloral, bismuth, cerium, oxalate cold, cocaine, carbonic acid water, prussic acid.

(d) *To lessen acidity by acting on stomach contents:*

Potassium, sodium and lithium carbonates and bicarbonates.

Magnesia and magnesia carbonate.

Lime water and chalk.

Act chemically, forming salts of the acid.

(e) *To increase secretion of HCl and Pepsin:*

Simple bitters, gentian, calumba, etc.

Nux vomica and strychnine.

Cinchona and quinine, hydrastis and salicin.

Alcohol (diluted).

All except alcohol act reflexly through taste nerves.

Alcohol probably increases blood supply.

(f) *Carminatives:*

Volatile oils—Cardamon, cloves, etc.

Camphor, charcoal, chloroform.

Alcohol.

Aid peristalsis by overcoming spasm: give feeling of well being.

III. DRUGS ACTING ON THE INTESTINE:

(a) *To promote digestion:*

Pancreatin, diastase.

Given before eating or in enteric pills.

(b) *To promote evacuation (purgatives):*

Calomel and mercury, podophyllin.

Mainly on the small intestine.

Hydragogues, salines, enemata, purgative oils, aloes, senna, etc.

Mainly on the large intestine.

(c) *To lessen peristalsis and relax spasm:*

Opium and morphine.

Acts on local nerve mechanism.

Tannic acid series, bismuth.

Act as astringents and protectives.

Atropine.

To relax spasm through paralysis of pneumogastric endings.

(d) *To destroy parasites by acting as muscle poisons to the parasites:*

Male fern, pomegranate, pumpkin seed. (Tape-worm.)

Santonin. (Round worm.)

Thymol. (Hook-worm.)

Quassia enema. (Pin-worm.)

(e) *Disinfectants and antiseptics:*

Mercurials and calomel. (True antiseptics.)

Saline cathartics.

Flush out offending matter.

Naphthol and betanaphthol.

Doubtful efficiency as antiseptics, but good deodorants.

Salol and salicylic acid, guaiacol and guaiacol carbonate.

Absorbed rather too rapidly. Salol is partly broken up in stomach.

IV. DRUGS USED FOR THEIR EFFECTS ON CIRCULATION:

1. *Heart:*

(a) *To strengthen contraction:*

Digitalis, strophanthus.

By stimulating pneumogastric, as well as heart muscle.

(b) *To accelerate pulse:*

Atropine.

Paralyzes ends of pneumogastric releasing its inhibition.

Caffeine.

A direct stimulating action on heart muscle.

(c) *To slow the pulse:*

Digitalis, strophanthus, squills and strychnine.

Stimulate inhibitory cardiac and vasoconstrictor centres.

Aconite and veratrine.

Stimulate inhibitory centre, and depress vasomotor centre and depress heart muscle.

2. Vessels:

(a) *To contract calibre and raise blood-pressure:*

Ergot

Stimulates vasoconstrictor centre, also vessel walls.

Strychnine.

Stimulates vasoconstrictor centre and *pneumogastric*.

Caffeine.

Stimulates vasoconstrictor centre and heart muscle.

Digitalis.

Stimulates vasoconstrictor centre, *pneumogastric* and vessel walls.

(b) *To relax vessels and lower blood pressure:*

Nitro-glycerin, amyl nitrite, sodium nitrite.

Act on vessel walls alone. Depress the heart in large doses.

(c) *To arrest internal hemorrhage:*

Ergot acts on constrictor centre and vessel walls.

Hydrastine and hydrastinine, similar to above.

Opium and morphine.

To allay restlessness.

Pituitrin.

Contracts blood-vessels—by central and local action—especially of uterus.

(d) *To remove fluid* (dropsy, anasarca):

Digitalis and squills.

Diuresis due to increased blood supply of kidney and higher pressure.

Caffeine and theobromine—see below.

Saline cathartics and hydragogues.

By fluid depletion of splanchnic vessels.

Diaphoretics (see Skin).

V. DRUGS USED FOR THEIR EFFECTS ON THE GENITO-URINARY SYSTEM.

1. *The kidneys:*(a) *To increase the secretion of urine:*

Caffeine and theobromine.

Stimulate kidney epithelium.

Digitalis and squills.

Diuresis due to increased blood supply of kidney.

Nitrates and acetates.

Probably stimulate renal epithelium.

Carbonates and citrates of alkaline metals.

Increase metabolism and flushing of tissues.

Calomel and mercurials.

Stimulate renal epithelium.

(b) *To render urine less acid:*

Alkali carbonates and bicarbonates.

Acetates, citrates.

Broken up into bicarbonates.

(c) *To render urine antiseptic:*

Copaiba, santal and cubebs.

Salol and salicylates.

Salol excreted as phenol and salicylate potash.

Sodium sulphocarbolate.

Urotropin.

Free formaldehyde compounds excreted in urine.

2. *The uterus:*(a) *To stimulate muscular contractions:*

Ergot.

Through spinal centre and on intrinsic nerves and muscles.

Quinine.

Uterine muscle probably effected directly.

Hydrastis.

Stimulates spinal centre (?).

Pituitrin.

Direct muscle-nerve action.

Pilocarpine.

Stimulates motor nerve terminations.

(b) *To promote menstruation:*

Vegetable purgatives—aloes, etc., by increasing pelvic turgidity.

Iron. To relieve accompanying chlorosis.

VI. DRUGS USED FOR THEIR EFFECTS ON THE RESPIRATORY SYSTEM :

(a) *To stimulate the respiratory centre:*

Atropine.

Quickens and deepens respirations; stimulates centre directly.

Caffeine:

Central stimulation, most noticeable after depression by narcotics.

Strychnine.

Central stimulation, most noticeable after depression by narcotics.

Camphor.

Weak action as compared with foregoing.

(b) *To reduce irritability of the respiratory centre in cough:*

Opium, morphine and codeine.

Heroin.

Chloral compounds and bromides.

(c) *To increase and liquefy bronchial secretion:*

Ipecac.

Acts reflexly, producing mild nausea.

Tartar emetic.

Acts reflexly, producing mild nausea.

Squills.

Acts reflexly—heart tonic as well as expectorant.

Ammonium carbonate and iodides of alkalies.

Ammonium carbonate a nauseating expectorant.

Iodides in sufficient doses are excreted through the respiratory tract and cause increased secretion of mucous. Later iodism.

(d) *To lessen bronchial secretion (?) (of doubtful utility):*

Benzoic acid, benzoin, tolu.

Ammonium chloride.

Cubebs, terpin hydrate, terebene.

(e) *To relax bronchial spasm in asthma:*

Lobelia.

Acts probably by depressing ganglia of bronchial muscles.

Atropine.

Acts probably by paralyzing motor nerve terminals of bronchial muscles.

Amyl nitrite.

Acts directly on unstriated muscle of bronchi.

VII. DRUGS USED FOR THEIR EFFECTS ON THE CENTRAL NERVOUS SYSTEM:

1. *Stimulants:*

(a) The spinal cord:

Strychnine.

Increases irritability of nerve cells by decreasing resistance to afferent impulses.

(b) The brain and medulla:

Atropine and cocaine.

Cerebral cortex-deleriants.

Caffeine.

Increases psychic activity, but inimical to mental concentration.

2. *Depressants:*

(a) To paralyze sensation—general anæsthetics:

Ether, chloroform, nitrous oxide.

Affect cerebral cortex.

(b) To induce sleep and rest—hypnotics or narcotics:

Opium and morphine.

Used when pain is present.

Alcohol.

Depresses cortex first, then rest of nervous system, but may cause excitement.

Chloral and compounds.

Used when insomnia is due to psychomotor irritability.

Bromides.

Depress entire nervous system. Useful only when due to anxiety—not to pain.

Hyoscin.

Depresses cortex, especially psychic area.

Cannabis Indica.

Resembles morphia, mingled cortical depression and stimulation.

Paraldehyde and sulphonals, etc.

Resemble alcohol—minus excitement stage.

(c) To relieve pain—analgesics or anodynes:

Opium.

Relieves sensation centrally at first, then peripherally. No local action.

Cannabis.

Non-stimulant and less anæsthetic than opium.
Unreliable.

Antipyrine, etc.

Sedative to central system; do not produce any psychic depression. Useless in acute inflammatory conditions, but helpful in neuralgia, etc.

Nitrites.

Sometimes of value in headache due to high blood-pressure.

Salicylates.

Of value in muscle and acute joint pains.

VIII. DRUGS USED TO REDUCE FEVER TEMPERATURE:

(a) Antipyrin, acetanilide, etc.

Affect heat regulating mechanism in fever, lowering point at which temperature has been maintained and causing increased heat loss.

(b) Quinine.

Does not affect heat regulating mechanism, more likely prevents abnormal katabolism.

(c) Aconite.

Causes heat loss by action on circulation. Also believed to have an action through the heat centre.

(d) Salicylic acid, etc.

Causes heat loss by dilating skin vessels. Central action in doubt. Not so efficient as antipyrin, etc.

(e) Diaphoretics. (See below.)

(f) Guaiacol.

Local application causes fall in temperature by producing after absorption a condition bordering on collapse.

IX. DRUGS USED FOR THEIR EFFECTS ON THE LIVER:

To increase the secretion of bile:

- (a) Ox-gall, sodium glycocholate.

Direct stimulants to gland through action on liver cells after absorption.

- (b) Salicylic acid.

Slight stimulant effect on liver cells.

X. DRUGS USED FOR EFFECTS ON THE BLOOD:

- (a) To increase the hæmoglobin:

Iron.

Principally in chlorosis. Absorbed from large intestine.

- (b) Arsenic.

Stimulates bone-marrow and red-cell forming function in pernicious and symptomatic anæmia.

- (c) To increase alkalinity:

Alkaline carbonates.

Absorbed as carbonates.

Acetates and citrates.

Become carbonates and bicarbonates.

XI. DRUGS USED FOR SPECIFIED DISEASES:

- (a) Malaria:

Quinine.

Kills the plasmodium.

Arsenic.

Corrects cachexia.

- (b) *Syphilis*:

Salvarsan and neosalvarsan.

Kill the parasite.

Mercury and iodides.

Believed to unite with toxic substances.

- (c) *Rheumatic fever*:

Salicylic acid, salicylates, salol. Taken up as sodium salicylate by inflamed tissues.

Excess of H_2CO_3 in tissues releases free salicylic acid which exerts a specific action in eliminating the inflammatory products?

(d) Amœbic dysentery :

Emetine.

Destroys *Amœba histolytica*.

(e) Myxœdema and some other thyroid diseases.

Thyroid extract.

Supplies the necessary iodothyron for animal metabolism.

(f) Gout :

Atophan and salicylates.

Demobilize urates.

Colchicum.

No reason for its supposed effects.

XII. DRUGS USED FOR THEIR EFFECTS ON THE SKIN :

(a) Irritants :

Mustard, cantharides, iodine, etc.

(b) Disinfectants :

Tar, ichthyol, sulphur, mercury, etc.

(c) Drugs administered internally to increase the secretion of perspiration :

Ipecacuanha, and other nauseating expectorants.

Increase of sweat and saliva a reflex from stomach irritation. Not so profuse as that following pilocarpin.

Ipecacuanha and opium.

Dover's powder. Opium aids by dilating peripheral vessels.

Camphor.

Dilates peripheral vessels slightly.

Pilocarpin.

Stimulates the brush-like endings of the secretory nerves. Most efficient diaphoretic. Not to be used when right heart is weak.

(d) Drugs administered internally to lessen secretion of perspiration (night sweats of phthisis, etc.) :

Atropine and belladonna.

Paralyze terminations of all secretory nerves.

Agaricin.

Paralyzes terminations of secretory nerves to sweat glands alone.

- (e) Drugs applied locally and internally to arrest secretion of milk:

Atropine.

Paralyzes secretory nerve terminations.

XIII. DRUGS USED LOCALLY FOR THEIR EFFECT ON THE EYE:

- (a) Drugs dilating the pupil, and relaxing accommodation:

Atropine and homatropine.

Paralyze the terminations of oculi motor nerve in iris and ciliary muscle.

Cocaine.

Stimulates terminations of nerve to dilator fibres.

In large quantities acts on ciliary muscle like atropine.

- (b) Drugs *contracting the pupil and ciliary muscle*:

Physostigmine or eserine.

Stimulates the terminations of motor nerves in unstriated muscle—antagonist to atropine.

Pilocarpin.

Action similar, though weaker.

DRUGS WHICH CAUSE ERUPTIONS AND CHANGES IN EXCRETIONS

DRUG ERUPTIONS

Drugs which, when administered—some externally, some internally, and some either externally or internally—may cause skin eruptions:

Aconite, antifebrin, antimony, antipyrine, arnica, arsenic, balsam of peru, belladonna, boric acid and borax, bromine and its compounds, cade oils, cannabis indica, cantharides, carbolic acid, chloral hydrate, chrysarobin, chrysophanic acid, copaiba, croton oil, cubebs, ergot, iodine and its compounds, iron, lead (acetate and carbonate), mercury, nuxvomica and strychnine, opium (morphine and other deriva-

tives), phenacetin, pix liquida (tar), podophyllin, quinine, salicylic acid and salicylates, silver nitrate, stramonium, sulphonal, sulphur, terebene, turpentine, thyroid gland substance and veronal.

Less commonly, eruptions follow the use of bitter almond, calcium sulphide, capsicum, chinolin, conium, hyoscyamus, ipecacuanha, cod liver oil, phosphorus, santonin, tannin and veratrum viride; but these are so rare as to be of little practical importance.

Serum injection may be followed by eruptions.

DRUGS WHICH COLOR THE STOOLS

Bismuth, iron, lead and most metallic salts color the stools black.

Mercury colors the stools green.

Phenolphthalein sometimes gives a red tint to alkaline stools.

Rhubarb colors the stools yellow.

Colchicum colors the stools yellow.

Purgatives usually darken the stools.

Milk of magnesia makes them gray.

DRUGS WHICH CHANGE THE COLOR OF URINE

Diuretics make it paler.

Irritants make it darker.

Methylene-blue colors acid urine green.

Phenol and salol make it dark and smoky.

Rhubarb may color it brown-bile color.

Santonin, yellow if acid—purple if alkaline.

Senna, red if acid—yellow if alkaline.

Sulphonal, dark red or smoky.

Trional, same as sulphonal.

DRUGS THAT ARE EXCRETED WITH MILK

Arsenic compounds	Quinine
Bromides	Sulphur
Iodides	Vegetable cathartics
Lead salts	Salol
Mercury salts	Volatile oils
Opiates	

READY REFERENCE TABLE OF POISONS AND ANTIDOTES

THE FOLLOWING TABULATED INFORMATION IS BASED ON THE TEXTS FORMULATED BY WELLCOME, WOOD, AND OTHER TOXICOLOGISTS. THE POISONS ARE GROUPED AS (a) CORROSIVE ACIDS, (b) POISONOUS ACIDS, (c) CAUSTIC ALKALIS, (d) MINERAL AND OTHER INORGANIC POISONS, (e) ORGANIC POISONS.

A TABLE OF POISONS AND ANTIDOTES

Poison	Symptoms	Treatment
Hydrochloric Acid Nitric Acid Sulphuric Acid (Oil of Vitriol)	CORROSIVE ACIDS Those of corrosive poisoning: 1. Pain in mouth, throat and abdomen, the mucous membrane being partially destroyed 2. Intense thirst 3. Difficulty in speaking and swallowing 4. Vomiting of altered blood-brown or black, with coagulated mucous and shreds of mucous membrane 5. Constipation and suppression of urine 6. Convulsions 7. Profound collapse (a) Skin—pale, cold, clammy (b) Face—cyanosed (c) Eyes—sunk, wild-looking, pupils often dilated (d) Pulse—rapid, thready, low tension (e) Respiration—labored (f) Temperature—subnormal 8. If perforation occur, symptoms of peritonitis 9. Staining of tissues and clothing	1. Do not use stomach tube or emetic, but neutralize the acid by giving one of the following: (a) whiting, (b) chalk, (c) wall plaster, (d) sodium carbonate (washing soda), (e) potassium carbonate, mixed with, or dissolved in, plenty of water, (f) magnesium carbonate, $\frac{1}{2}$ to 1 oz. in a tumblerful of water, or (g) soap and water in large draughts 2. Next give one of the following: (a) milk and egg, (b) olive oil, $\frac{1}{4}$ pint in 1 pint of water, or (c) thick gruel 3. Diminish shock and ease pain with morphine sulphate (hypodermic) gr. $\frac{1}{3}$ 4. To sustain patient, rectal feeding
Oxalic Acid Salt of Lemons		1. Do not use stomach tube or emetic, but give (a) whiting, (b) chalk, (c) wall plaster, or (d) lime water, freely; or (e) saccharated solution of lime in drachm doses, frequently repeated. A full dose of castor oil should be given afterwards 2. Milk should be freely given 3. To sustain patient, rectal feeding

Action of Corrosive Acids

<i>Action of Corrosive Acids</i>	On skin and mucous membrane	On clothing	Treatment
Hydrochloric Nitric	Greyish-white Bright yellow	Bright red Yellow, orange- red, or brown	1. Insert stomach tube with care, and wash out the stomach with successive quantities of one of the following, until there is no smell of carbolic acid in fluid coming from the stomach: (a) sodium sulphate, $\frac{1}{2}$ oz. in 1 pint of warm water; (b) magnesium sulphate, $\frac{1}{2}$ oz., in one pint of warm water; or (c) saccharated solution of lime, 1 drachm, in one pint of warm water; (d) alcohol 20 per cent. 2. Empty the stomach and give one of the following: (a) olive oil, about $\frac{1}{4}$ pint, in one pint of water; (b) milk freely; or (c) white of egg in water, freely 3. Give sodium or magnesium sulphate, $\frac{1}{2}$ oz., in warm water
Sulphuric	White or char- ring to brown or black	Dirty brown, edges may be red	
Oxalic	White or brown	Brown to orange-red	
Poison	Symptoms		
Carbolic Acid (Phenol)	<i>POISONOUS ACIDS</i> 1. Those of corrosive poisoning 2. Lips and mouth, white and hardened 3. Urine greenish, dark or suppressed 4. Nervous symptoms—reflexes abolished, muscles relaxed, stupor, anaesthesia. There may be return to consciousness, with apparent great improvement, and then some hours after, death may occur suddenly from collapse		

A TABLE OF POISONS AND ANTIDOTES—Continued

Poison	Symptoms	Treatment
Carbolic Acid (Phenol)		4. Give general stimulants, and apply warmth to extremities 5. Artificial respiration, and intravenous or rectal injection of saline solution
Hydrocyanic Acid (Prussic Acid) Cyanides	Symptoms come on in the act of swallowing, or immediately afterwards 1. Giddiness, staggering, loss of motor power 2. Insensibility 3. Respiration—panting 4. Convulsions may occur 5. Profound collapse: (a) Skin—cold, clammy (b) Eyes—fixed, glistening, pupils dilated, no reaction (c) Limbs—flaccid (d) Pulse—imperceptible 6. The breath may have the odour of bitter almonds	1. Place patient in open air 2. (a) Stomach tube or (b) emetic 3. Cold douche (from height) to head and spine, or cold water dashed on continuously 4. Artificial respiration (20 to minute), and Ammonia inhalation by the nostrils 5. Dissolve about gr. 15 of iron sulphate and about min. 20 of tincture of ferric chloride in a wineglassful of water, then add 1 to 2 drachms of magnesium carbonate previously made into a thin cream with water. Mix and administer, and repeat if necessary (Note: The above quantities are equivalent to about min. 100 of acid hydrocyan. dil., U. S. P.) 6. Stimulants, hypodermically or internally

CAUSTIC ALKALIES

1. Gastro-intestinal symptoms, as in corrosive poisoning
2. Purging usual, with pain and straining
3. Body cold, with cold sweat
4. Countenance anxious
5. Pulse rapid and weak

Strong Ammonia
Caustic Potash
Caustic Soda
Lye

1. Do not use stomach pump or emetic, but neutralize alkali by giving one of the following: (a) vinegar, freely diluted with water; (b) lemon juice in water; (c) citric acid in water; (d) tartaric acid, $\frac{1}{2}$ drachm, in half pint of water repeated

2. When the alkali is neutralized, give one of the following: (a) milk, very freely; or (b) olive oil, $\frac{1}{4}$ pint in one pint of water; (c) white of egg
3. To lessen shock and ease pain, use morphine sulphate (hypodermic) gr. $\frac{1}{3}$
4. Give stimulants

MINERAL AND OTHER INORGANIC POISONS

Symptoms usually appear in from a quarter of an hour to one hour

1. Burning heat, and constriction or choking in throat, rendering swallowing difficult
2. Nausea, and incessant vomiting and purging. The vomited matter may be green from bile, or, in the case of arsenic, black from the admixture of soot, or blue from indigo
3. Pain in the stomach and abdomen
4. Cramps in calves of legs
5. Urine may be suppressed
6. There may be delirium or paralysis

Antimony Com-
pounds:
Antimony and Po-
tassium Tartrate
(Tartar Emetic)

1. Incessant vomiting is usually a symptom of poisoning by antimony compounds. In such cases the vomiting should be encouraged by draughts of tepid water. Should vomiting not have occurred, use (a) stomach tube, or (b) emetic
2. (a) strong tea; or (b) tannin, gr. 30 in warm water, and repeat draughts as often as vomiting occurs
3. When vomiting subsides, give (a) white of egg in water, or (b) milk, freely

A TABLE OF POISONS AND ANTIDOTES--Continued

Poison	Symptoms	Treatment
Antimony Compounds Antimony and Potassium Tartrate (Tartar Emetic)	7. Collapse—skin cold, clammy, and may show eczematous rash; pulse small, quick, irregular or imperceptible	4. Relieve pain with morphine sulphate (hypodermic), gr. 1/3 5. Treat collapse with stimulants internally. Hot water bottles to extremities, and intravenous or rectal injection of saline solution
Arsenic and its Preparations (Acute poisoning)	See Antimony	1. (a) stomach tube, or (b) emetic. The complete removal of contents is important 2. (a) ferric hydrate, prepared as follows: Dilute 1 1/2 oz. of tincture of ferric chloride with a wineglassful of water, and add it to a solution of 1/2 oz. of sodium carbonate (washing soda), or 1/2 oz. water of ammonia, in about half a tumblerful of water. Mix and administer. Repeat the draught if necessary. (b) dialysed iron in frequently repeated tablespoonfuls until ten have been taken, each followed by a little common salt dissolved in water 3. Give (a) milk and eggs; (b) olive oil, 1/4 pint, in one pint of water; (c) barley water

Copper Salts: Verdigris Blue Vitrol (Acute Poisoning)	1. Salivation 2. Gastro-intestinal irritation, vomiting (bluish or greenish), griping - Late symptoms are: 3. Giddiness and headache 4. Delirium and convulsions, which may be very violent 5. Pulse rapid 6. Jaundice and suppression of urine 7. Coma	4. Stimulants for prostration; ice for thirst; hot water bottles to extremities 5. When all acute symptoms have subsided, morphine sulphate (hypodermic), gr. $\frac{1}{3}$ Vomiting usually occurs in cases of poisoning by copper salts. When this is not the case, 1 and 2 should be used 1. Before emptying stomach, give large quantities of milk and eggs 2. (a) Stomach tube, or (b) emetic 3. One-half drachm of potassium ferrocyanide in half a tumblerful of water	4. Demulcent drinks 5. (a) Morphine sulphate (hypodermic), gr. $\frac{1}{3}$, or (b) opium tincture, min. 20, in $\frac{1}{2}$ oz. of water, by mouth	1. (a) Stomach tube, or (b) emetic 2. (a) Sodium bicarbonate, dr. 2, in half a tumblerful of water. If the poison be iodine, large quantities of starch made into draughts with cold water 3. Demulcents: and (a) milk and eggs, or (b) milk, and flour boiled with water
Iodine Preparations: Iodine Iodides Iodoform	Iodine or Tincture: 1. Pain and heat in throat and stomach 2. Vomiting and purging, vomit being yellow, or blue if starchy matter be present in the stomach. Stools may contain blood 3. Intense thirst 4. May be giddiness, faintness and convulsions			

A TABLE OF POISONS AND ANTIDOTES—Continued

Poison	Symptoms	Treatment
Iodine Preparations Iodine Iodides Iodoform	Iodides:— Large doses may give acute irritant symptoms, like iodine <i>Chronic poisoning</i> , iodism is shown by: 1. Frontal headache 2. Lachrymation, coryza 3. Salivation 4. Inflammation about the fauces, which may extend to the gums or to the trachea 5. Skin—erythema and acne Iodoform:— Symptoms vary much in severity, and usually only two or three are present at one time 1. Giddiness 2. Gastro-intestinal irritation, vomiting 3. Erythema 4. Temperature high, pulse rapid 5. Pupils dilated 6. Persistent drowsiness 7. Mental symptoms—melancholia, hallucinations, delirium—especially at night 1. Metallic taste, choking sensation 2. Pain in stomach, vomiting and purging of stringy mucus and blood 3. Tongue may be white and shrivelled 4. Skin cold, clammy 5. Pulse feeble, rapid	4. Relieve pain with morphine sulphate (hypodermic), gr. 1/3 Iodism: Curative 1. Stop the administration 2. Give sodium bicarbonate 3. Starch demulcents and large quantities of water 4. Warm baths 5. Symptomatic treatment
Mercury and Salts (Acute Poisoning) Corrosive Sublimete Vermilion		1. Do not empty stomach before giving large quantities of (a) white of egg mixed with milk and water, much to be preferred to (b) flour and water 2. (a) Stomach tube, or (b) emetic

Red Precipitate White Precipitate

Lead and Salts:

(Acute Poisoning)

6. Urine suppressed

1. Metallic taste, dry throat, intense thirst
2. Abdominal colic
3. Constipation, fæces dark, vomiting may occur
4. Giddiness, stupor, convulsions, death

Phosphorus: Rat Paste Matches

Symptoms usually occur in three stages:
I. A few hours after administration

1. Garlic taste
2. Gastro-intestinal irritation—burning pain, thirst, swelling of abdomen, vomiting of blood (green or black). Vomit has garlic odour and in the dark is phosphorescent

The patient may die or there may be:

- II. Intermission of symptoms for three days or more, with feeling of malaise, followed by:

III. Final state:

1. Intense jaundice
2. Enlarged liver and distended abdomen

3. For pain and purging, opium tincture, min. 20 in one oz. of water
4. Demulcents, and stimulants if much depression

1. (a) Stomach tube, or (b) emetic
2. Give (a) magnesium sulphate, oz. $\frac{1}{2}$, in a tumblerful of water, or (b) sodium sulphate, oz. $\frac{1}{2}$, in a tumblerful of water; or (c) dilute sulphuric acid, min. 30, in a tumblerful of water

3. (a) Milk; (b) white of egg; or (c) demulcent drinks, all freely
4. Relieve pain with morphine sulphate (hypodermic), gr. $\frac{1}{3}$

1. (a) Stomach tube, or (b) emetic
2. Copper sulphate, gr. 3, dissolved in 4 oz. of water, every five minutes until vomiting is induced, then every fifteen to thirty minutes
3. Old, or French turpentine, min. 40, in 1 oz. of water every $\frac{1}{4}$ hour, for one hour, then three times a day

- Avoid American or German Turpentine
4. Magnesium sulphate, $\frac{1}{2}$ oz., as a purge

5. Demulcents, especially milk and eggs
Avoid oils and fats
6. Morphine sulphate (hypodermic), gr. $\frac{1}{3}$, for pain

A TABLE OF POISONS AND ANTIDOTES—Continued

Poison	Symptoms	Treatment
Phosphorus: Rat Paste Matches Silver Nitrate: (Lunar Caustic)	3. Great prostration—cold sweat, anxious look, feeble pulse, muscular twittings, coma 1. Pain in throat and stomach 2. Vomiting of whitish, flaky matter, which blackens on exposure to light	1. Two tablespoonfuls of common salt in a tumblerful of water, repeated if necessary 2. Emetic to remove precipitated silver chloride 3. Large draughts of white of egg in water <i>Do not use stomach tube or emetic,</i> because of corrosion of membranes, but give: 1. Large draughts of white of egg and milk 2. Large quantities of sodium carbonate or potassium carbonate, dissolved in warm water 3. (a) Tannin, or (b) strong tea 4. Demulcents 5. For pain: (a) opium tincture, min. 30, or (b) morphine sulphate (hypodermic), gr. 1/3 1. (a) Stomach tube, or (b) emetic 2. Digitalin (hypodermic), gr. 1/100 3. Stimulants. Warmth to extremities of intravenous or rectal injections of saline solution
Zinc Salts: White Vitriol	1. Lips and mouth corroded 2. Pain in throat and stomach, and difficulty in swallowing 3. Vomiting—blood-stained 4. Pulse and respiration rapid 5. Convulsions, paralysis, coma	
Aconite Aconitine	1. Tingling and numbness of tongue and mouth, and sense of formication of the body 2. Nausea and vomiting, with epigastric pain 3. Dyspnoea 4. Pulse irregular, weak 5. Skin cold, clammy, features bloodless	1. (a) Stomach tube, or (b) emetic 2. Digitalin (hypodermic), gr. 1/100 3. Stimulants. Warmth to extremities of intravenous or rectal injections of saline solution 4. Artificial respiration and friction

Alcohol: (Acute Poisoning)	6. Giddiness, staggering walk, limbs feel weighty 7. The mind remains clear 1. Face flushed usually, lips vivid 2. Eyes congested, pupils usually dilated and fixed 3. Skin—sweating 4. Giddiness, tottering gait 5. Confusion of thought, vacant expression 6. Convulsions, stupor, coma There may be apparent recovery, then after some hours or days, sudden death	5. Recumbent position to be maintained 6. Strychnine sulphate (hypodermic), gr. 1/60 1. Ammonium carbonate, gr. 30, dissolved in half a tumblerful of water 2. If necessary, (a) stomach tube. If patient delirious, produce emesis with (b) apomorphine hydrochloride (hypodermic), gr. 1/10 3. Rouse patient; cold douches; hot coffee 4. Artificial respiration 5. Warmth to extremities 1. Stimulants 2. Warmth to extremities 3. Strychnine sulphate (hypodermic), gr. 1/30 to gr. 1/10 4. Artificial respiration 5. Recumbent position to be maintained
Antipyrine } Antiferrin } Phenacetin } Exalgine } Resorcin }	1. Vomiting 2. Face cyanosed 3. Skin—profuse sweat. Sometimes rash simulating measles, scarlatina or pemphigus 4. Collapse—feeble irregular pulse, slow respiration 1. Secretions paralyzed, hence throat and skin are dry, and urine is suppressed 2. Skin flushed 3. Temperature raised 4. Pulse quick 5. Respiration slow and deep 6. Pupils widely dilated 7. Delirium	1. (a) Stomach tube, or (b) emetic 2. (a) Pilocarpine nitrate (hypodermic), gr. 1/2; or (b) morphine sulphate (hypodermic), gr. 1/3 3. Stimulants and hot coffee 4. Artificial respiration. Warmth
Belladonna: Atropine Nightshade Berries	1. Burning pain in throat and stomach, difficulty in swallowing 2. Vomiting and diarrhoea—mucus and blood may contain shining particles of the powder 3. Salivation and swelling of salivary glands	1. (a) If patient be seen shortly after poison is swallowed, and mucus membranes are not yet blistered, use stomach tube; (b) if throat blistered, produce emesis with
Cantharides: Blistering Fluid Spanish Fly		

A TABLE OF POISONS AND ANTIDOTES—Continued

Poison	Symptoms	Treatment
Cantharides: Blistering Fluid Spanish Fly	- Incessant desire to micturate, only a little blood or albuminous urine being passed - Peritonitis, with headache, quick pulse, high temperature - Convulsions and stupor	- apomorphine hydrochloride, gr. $\frac{1}{10}$, and strychnine hydrochloride (hypodermic), gr. $\frac{1}{60}$ - White of egg in milk or barley water, or (b) thick gruel - Stimulants - Relieve pain with morphine sulphate (hypodermic), gr. $\frac{1}{3}$ Avoid oils and fats Same as Croton Oil
Castor Oil Seeds Chloral, Hydrated Chloralformamide	See Croton Oil - Skin cold, face livid - Temperature subnormal - Pulse and respiration slow - Deep coma	(a) Stomach tube, or (b) emetic - Strychnine sulphate (hypodermic) gr. $\frac{1}{60}$ - Warmth: friction; hot coffee - Stimulants - Artificial respiration - Oxygen inhalation
Chloroform: Failure of heart or respiration in Anaesthesia		- Pull out tongue, place head lower than body; fresh air - Artificial respiration (20 to minute) (a) Caffeine sodio-benzoate; (b) strychnine sulphate (hypodermic), gr. $\frac{1}{30}$; (c) brandy, diluted, per rectum; and (d) atropine sulphate intravenously - Venesection of jugular vein - As a last resource, massage of heart
Cocaine	- Pallor, dry skin - Giddiness and fainting	- Stomach tube - Stimulants: brandy or smelling salts

Colchicum and Croton Oil and Violent Purgatives	Pulse and respiration quick 3. Nervous symptoms—tremors, delusions, convulsions Gastro-intestinal irritation, followed by collapse 1. Abdominal colic 2. Vomiting, purging, matter sometimes blood-stained or watery 3. Features pale and pinched 4. Skin—perspiration 5. Pulse, small, weak, thready 6. Urine, diminished or suppressed 7. May be delirium	3. Strychnine sulphate (hypodermic), gr. $\frac{1}{30}$ 4. Digitalin (hypodermic), gr. $\frac{1}{50}$ 5. Inhalations of amyl nitrate, or aromatic ammonia 6. Artificial respiration 1. (a) Stomach tube, or (b) emetic. If stomach tube be employed, wash stomach out with milk, or olive-oil, 4 oz. in one pint of water 2. Demulcent drinks, especially white of egg in milk 3. Relieve pain by (a) morphine sulphate (hypodermic), gr. $\frac{1}{3}$ or (b) opium tincture, min. 20 4. Stimulants 1. (a) Stomach tube, or (b) emetic 2. Strychnine sulphate (hypodermic), gr. $\frac{1}{60}$ 3. Warmth and stimulants 4. Artificial respiration
Conium (Hemlock)	1. Motor paralysis, shown by: (a) Weakness of limbs, staggering gait (b) Inability to swallow (c) Paralysis of muscles of respiration, causing asphyxia 2. Pupils dilated and fixed, loss of sight 3. Consciousness is preserved 1. Abdominal pain, vomiting 2. Headache, lethargy, delirium, convulsions, coma	1. (a) Stomach tube, or (b) emetic, the best being apomorphine hydrochloride, gr. $\frac{1}{10}$ 2. (a) Tannin, gr. 10, in 2 oz. of water, repeated frequently; or (b) large draughts of strong tea or coffee, or (c) 1 to 4000 solution of perman- ganite of potash
Digitalis (Foxglove)	3. Pulse, slow, small, irregular 4. Pupils dilated 5. Skin cold, pale, covered with sweat 6. Urine suppressed	

A TABLE OF POISONS AND ANTIDOTES--Continued

Poison	Symptoms	Treatment
Digitalis (Foxglove)		3. Stimulants; warmth to extremities 4. Aconite to control rapidity of the heart-beat 5. Recumbent position to be maintained Same as Croton Oil
Elaterinum Elaterium Fungi, Poisonous (Muscarine)	See Croton Oil	1. (a) Stomach tube, or (b) emetic 2. Purgatives, <i>e.g.</i> , castor oil, 1 oz. 3. Stimulants. Warmth to extremities 4. Atropine sulphate (hypodermic), gr. 1/60 5. Relieve pain with morphine sulphate (hypodermic), gr. 1/8 1. Fresh air, artificial respiration; friction 2. Oxygen inhalation. Ammonia to nostrils 3. Warmth and stimulants 4. Intravenous, or rectal injection of saline solution 5. Respiratory and cardiac tonics 6. Cold douche to head and chest Same as Belladonna Same as Croton Oil 1. (a) Stomach tube, or (b) emetic 2. Stimulants. External warmth 3. Artificial respiration 4. Hypodermic injection of strychnine sulphate, gr. 1/30
Gases, Poisonous: Acetylene Carbon Dioxide Carbon Monoxide Coal Gas Marsh Gas Pit Gas	1. Giddiness and ringing in ears 2. Lividity of face and body, in most cases 3. Loss of muscular power 4. Heart and respiration—violent action 5. Pupils dilated, no reaction 6. Convulsions, coma or asphyxia	
Hyoscyamus Jalap Nicotine: Tobacco Weed Killer	See Belladonna See Croton Oil 1. Burning acrid sensation in mouth and throat 2. Depression, giddiness, nausea, vomiting, coldness of surface, clammy sweat 3. Loss of consciousness, sighing respiration 4. Coma	

Opium: Chlorodyne Codeine Dionin Dover Powder Heroin Laudanum Morphine Paregoric Soothing Syrup	After preliminary stage of mental excitement Headache, weariness, sleepiness 1. Diminution of sensibility 2. Pupils contract to "pin point," and later, have no reaction 3. Face pale or cyanosed, skin cold 4. Muscular relaxation 5. Respiration slow, irregular, stertorous 6. Pulse feeble 7. Coma	1. (a) Stomach tube, or (b) emetic 2. Hot coffee 3. Potassium permanganate, 8 to 10 gr. dissolved in half a tumblerful of water, should be given. In case of laudanum poisoning, six grains of potassium permanganate, dissolved in plenty of water, should be taken for each ounce of laudanum. It should be dissolved in from four to eight ounces of water, and the stomach afterwards washed out two or three times, at intervals of half-an-hour, with a weak solution of potassium permanganate. In poisoning by hypodermic injection of morphine, the stomach should also be washed out with a weak solution of potassium permanganate 4. Rouse patient and dash cold water in face 5. Atropine sulphate (hypodermic), gr. $\frac{1}{30}$, repeated if necessary, until gr. $\frac{1}{4}$ has been taken 6. Warmth to extremities. Coffee by rectum 7. Artificial respiration. Inhalation of oxygen 8. (a) Strychnine sulphate (hypodermic), gr. $\frac{1}{30}$; or (b) caffeine sodio-benzoate (hypodermic), gr. $\frac{1}{2}$
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A TABLE OF POISONS AND ANTIDOTES--*Concluded*

Poison	Symptoms	Treatment
Gasoline Kerosene Petroleum	1. Burning in mouth, oesophagus and stomach 2. Vomiting, matter shows layer of oil, and has odor of paraffin 3. Thirst and restlessness, especially at night 4. Breath smells of oil 5. Body cold, face pale and anxious 6. Pulse feeble but regular 7. Respiration sighing 8. Coma may ensue	1. (a) Stomach tube, or (b) emetic 2. Stimulants; warmth; friction 3. Strychnine sulphate (hypodermic), gr. $\frac{1}{30}$
Ptomaines: Animal Alkaloids Poisonous Fish Poisonous Meat Cheese and Ice Cream Poison- ing Snake Bite	1. Vomiting and purging 2. Colic 3. Headache 4. Great muscular weakness 5. Tongue often brown 6. Temperature raised 7. Pulse quick 1. Locally—pain, swelling, inflammation 2. Faintness, depression, exhaustion 3. Vomiting 4. Cold sweats 5. Paralysis, first of limbs, then of whole body 6. Unconsciousness 7. Albuminuria and convulsions may occur	1. (a) Stomach tube, or (b) emetic 2. Stimulants for collapse 3. Purgatives 4. Atropine sulphate (hypodermic) gr. $\frac{1}{60}$ 1. Ligate the part above the bite 2. Incise and cauterise 3. Strychnine nitrate (hypodermic), gr. $\frac{1}{10}$ 4. (a) inject into wound (or, if there be much swelling, at two or three spots around the wound) potassium permanganate (hypodermic), gr. 2; or, (b) if case be less serious, place potassium permanganate, gr. 5, powdered, directly in the wound 5. Anti-venom serum, by hypodermic, or, preferably, intravenous injection 6. Stimulants; ammonium carbonate, or aromatic spirits of ammonia, well diluted, in full doses, repeated

Strychnine:
Nux Vomica

1. Feeling of suffocation, and lividity of face
2. Tetanic convulsions, with short intermissions, causing
 - (a) Sweating and exhaustion
 - (b) Opisthotonos
 - (c) Risus sardonicus
 - (d) Starting eyeballs
 - (e) Fixed chest and hard abdominal muscles
3. Hearing and sight are acute, and consciousness is retained
4. *The jaw muscles are not affected until late*

Brucine

1. (a) wash out stomach with stomach tube, if condition of patient permits; (b) emetic; apomorphine hydrochloride (hypodermic), gr. 1/10, is best in this case
2. (a) tannin, gr. 20 to gr. 40, in 2 oz. of water; or (b) iodine tincture, dr. ½, in half a tumblerful of water, followed by emetic or stomach tube
3. Potassium bromide, dr. 2, in a tumblerful of water, to be repeated every quarter of an hour if necessary
4. *Inhalation of chloroform to control convulsions.* In severe cases this is the first step in treatment
5. Artificial respiration in the stage of collapse and respiratory failure
1. (a) Stomach tube or (b) emetic
2. Stimulants and purgatives
3. Warmth to extremities
4. (a) Strychnine sulphate (hypodermic), gr. 1/30 to gr. 1/10; or (b) digitalin (hypodermic), gr. 1/100
5. Artificial respiration
6. Recumbent position to be maintained
1. (a) Stomach tube, or (b) emetic
2. Magnesium sulphate, oz. 1, in half a tumblerful of water, as a purge
3. Morphine sulphate (hypodermic), gr. 1/3
4. Demulcent drinks

Sulphonal
Trional
Veronal

1. Pain in stomach, and vomiting
2. Constipation
3. Nervous symptoms—confusion of mind, ataxia and partial paralysis
4. Pupils normal and react to light
5. Red urine later, suppression of urine
6. Profound collapse and unconsciousness

Turpentine

1. Turpentine odor in breath
2. Respiration stertorous
3. Pupils contracted
4. Tetanic convulsions, and coma
5. Irritability of bladder, *urine having odor of violets.* Has some semblance to opium poisoning

TABLE OF DOSES

	Apothecaries	Metric
Acetanilidum	gr. 4	0.25 gm.
Acetphenetidinum	gr. 7½	0.5 gm.
Acidum Aceticum Dil.	min. 30	2 mils.
Acidum Benzoicum	gr. 7½	0.5 gm.
Acidum Boricum	gr. 7½	0.5 gm.
Acidum Camphoricum	gr. 15	1 gm.
Acidum Carbolicum (Phenol)	gr. 1	0.005 gm.
Acidum Carbolicum Liquefactum	min. 1	0.05 mil.
Acidum Citricum	gr. 7½	0.5 gm.
Acidum Gallicum	gr. 15	1 gm.
Acidum Hydriodicum Dil.	min. 8	0.5 mil.
Acidum Hydrobromicum Dil.	fl. dr. 1	4 mils.
Acidum Hydrochloricum Dil.	min. 15	1 mil.
Acidum Hydrocyanicum Dil.	min. 1½	0.1 mil.
Acidum Lacticum	min. 30	2 mils.
Acidum Nitricum Dil.	min. 30	2 mils.
Acidum Nitro-hydrochlor. Dil.	min. 15	1 mil.
Acidum Phosphoricum Dil.	min. 30	2 mils.
Acidum Salicylicum	gr. 7½	0.5 gm.
Acidum Sulphuricum Aromat.	min. 15	1 mil.
Acidum Sulphuricum Dil.	min. 30	2 mils.
Acidum Sulphurosum	min. 30	2 mils.
Acidum Tannicum	gr. 7½	0.5 gm.
Acidum Tartaricum	gr. 7½	0.5 gm.
Aconitina	gr. 1/400	0.00015 gm.
Aconitum	gr. 1	0.005 gm.
Aether	min. 15	1 mil.
Aether Aceticus	min. 15	1 mil.
Aethylis Carbamas	gr. 15	1 gm.
Aloe	gr. 4	0.25 gm.
Alouinum	gr. 1	0.005 gm.
Alumen	gr. 7½	0.5 gm.
Ammonii Benzoas	gr. 15	1 gm.
Ammonii Bromidum	gr. 15	1 gm.
Ammonii Carbonas	gr. 4	0.25 gm.
Ammonii Chloridum	gr. 7½	0.5 gm.
Ammonii Iodidum	gr. 4	0.25 gm.
Ammonii Salicylas	gr. 4	0.25 gm.
Ammonii Valeras	gr. 7½	0.5 gm.
Amylis Nitris	min. 3	0.2 mil.
Antifebrinum (Acetanilidum)	gr. 4	0.25 gm.
Antimonii et Potassii (expectorant)	gr. 1/10	0.005 gm.
Tartras (emetic)	gr. ¼	0.03 gm.
Antipyrina	gr. 4	0.25 gm.
Apomorphinæ (expectorant)	gr. 1/30	0.002 gm.
Hydrochloridum (emetic)	gr. 1/10	0.005 gm.
Argenti Nitras	gr. 15	0.01 gm.
Arseni Iodidum	gr. 1/10	0.005 gm.
Arseni Trioxidum	gr. 1/30	0.002 gm.
Asafoetida	gr. 4	0.25 gm.
Aspirin	gr. 5 to gr. 15	0.3 gm. to 1 gm.
Atropina	gr. 1/160	0.0004 gm.
Atropinæ Sulphas	gr. 1/160	0.0004 gm.
Benzonaphthol	gr. 4	0.25 gm.
Bismuthi Citras	gr. 2	0.125 gm.
Bismuthi et Ammonii Citras	gr. 2	0.125 gm.
Bismuthi et Ferri Citras	gr. 5 to gr. 10	0.3 gm. to 0.6 gm.
Bismuthi et Lithii Citras	gr. 2 to gr. 5	0.13 gm. to 0.3 gm.
Bismuthi Subcarbonas	gr. 7½	0.5 gm.
Bismuthi Subgallas	gr. 4	0.25 gm.
Bismuthi Subnitras	gr. 7½	0.5 gm.
Bismuthi Subsalcylas	gr. 4	0.25 gm.

TABLE OF DOSES—Continued.

	Apothecaries	Metric
Bismuthi Tartaras.....	gr. 2 to gr. 5	0.13 gm. to 3 gm.
Borax (Sodii Boras).....	gr. 7½	0.5 gm.
Bromoformum.....	min. 3	0.2 mil.
Butyl-Chloral Hydras.....	gr. 5 to gr. 20	0.3 gm. to 1.3 gm.
Caffeina.....	gr. 1	0.065 gm.
Caffeina Citrata.....	gr. 2	0.125 gm.
Caffeina Citrata Efferves.....	gr. 60	4 gm.
Calcii Bromidum.....	gr. 15	1 gm.
Calcii Carbonas Præcip.....	gr. 15	1 gm.
Calcii Chloridum.....	gr. 7½	0.5 gm.
Calcii Glycerophosphas.....	gr. 2 to gr. 5	0.13 gm. to 0.3 gm.
Calcii Hypophosphis.....	gr. 7½	0.5 gm.
Calcii Iodo-ricinoleas.....	gr. 3 to gr. 9	0.2 gm. to 0.6 gm.
Calcii Lactas.....	gr. 5 and upwards	0.3 gm. and upwards
Calcii Phosphas Præcip.....	gr. 15	1 gm.
Calcii Sulphidum (Calx Sulphurata).....	gr. 1	0.065 gm.
Calomelas (laxative).....	gr. 2	0.125 gm.
(exalterative).....	gr. 1	0.065 gm.
Camphora.....	gr. 2	0.125 gm.
Camphora Monobromata.....	gr. 2	0.125 gm.
Cannabine Tannas.....	gr. 3 to gr. 10	0.2 gm. to 0.6 gm.
Cannabis Indica.....	gr. 1	0.065 gm.
Capsicinum.....	gr. 1/8 to gr. ¼	0.008 gm. to 0.015 gm.
Capsicum.....	gr. 1	0.065 gm.
Carbo Ligni.....	gr. 15	1 gm.
Cerebrin.....	gr. 5 to gr. 20	0.3 gm. to 1.3 gm.
Cerii Oxalas.....	gr. 1	0.065 gm.
Chloralum Hydratum.....	gr. 15	1 gm.
Chloralformamidum.....	gr. 15	1 gm.
Chloroformum.....	min. 5	0.3 mil.
Cocaina.....	gr. ½	0.03 gm.
Cocainæ Hydrochloridum.....	gr. ½	0.03 gm.
Codeina.....	gr. ½	0.03 gm.
Codeinæ Phosphas.....	gr. ½	0.03 gm.
Codeinæ Sulphas.....	gr. ½	0.03 gm.
Colchici Cormus.....	gr. 4	0.25 gm.
Colchici Semen.....	gr. 3	0.20 gm.
Colchicina.....	gr. 1/128	0.0005 gm.
Cotarninæ Hydrochloridum.....	gr. ¼ to gr. ¾	0.015 gm. to 0.05 gm.
Creosotum.....	min. 3	0.2 mil.
Cubeba.....	gr. 15	1 gm.
Cupri Sulphas (astringent).....	gr. 1/5	0.01 gm.
Cupri Sulphas (emetic).....	gr. 4	0.25 gm.
Didymin.....	gr. 5 and upwards	0.03 gm. and upwards
Digitalinum (amorph.).....	gr. 1/100 to gr. 1/30	0.0006 gm. to 0.002 gm.
Digitalinum (cryst.).....	gr. 1/500 to gr. 1/130	0.00013 gm. to 0.0005 gm.
Elaterinum.....	gr. 1/10	0.005 gm.
Emetina (expectorant).....	gr. 1/200 to gr. 1/50	0.0003 gm. to 0.0013 gm.
Emetina (emetic).....	gr. 1/6 to gr. 1/3	0.01 gm. to 0.02 gm.
Emetinæ (expectorant).....	gr. 1/200 to gr. 1/50	0.0003 gm. to 0.0013 gm.
Hydrobrom (emetic).....	gr. 1/6 to gr. 1/3	0.01 gm. to 0.02 gm.
Ergota.....	gr. 30	2 gm.
Ergotinæ Citras.....	gr. 1/200 to gr. 1/50	0.0003 gm. to 0.0013 gm.
Ergotoxina.....	gr. 1/100 to gr. 1/50	0.00065 gm. to 0.0013 gm.
Erythrol Tetranitras.....	gr. ½ to gr. 1	0.03 gm. to 0.06 gm.
Eucainæ Hydrochloridum.....	gr. 1/5 to gr. ½	0.013 gm. to 0.03 gm.

TABLE OF DOSES—*Continued.*

	Apothecaries	Metric
Eucaine Lactas	gr. 1/5 to gr. 1/4	0.013 gm. to 0.03 gm.
Eucalyptol	min. 5	0.3 mil.
Ext. Aloes	gr. 2	0.125 gm.
Ext. Belladonnæ Foliorum	gr. 1/5	0.01 gm.
Ext. Cannabis Indicæ	gr. 1/5	0.01 gm.
Ext. Cascaræ Sagradæ	gr. 4	0.25 gm.
Ext. Cimicifugæ	gr. 4	0.25 gm.
Ext. Colchici Cormi	gr. 1	0.065 gm.
Ext. Colocynthis	gr. 1/4	0.03 gm.
Ext. Colocynthis Comp	gr. 7 1/2	0.5 gm.
Ext. Digitalis	gr. 1/5	0.01 gm.
Ext. Ergotæ (Ergotinum)	gr. 4	0.25 gm.
Ext. Euonymi (Euonyminum)	gr. 2	0.125 gm.
Ext. Hyoscyami	gr. 1	0.065 gm.
Ext. Kramerie	gr. 7 1/2	0.5 gm.
Ext. Nucis Vomica	gr. 1/4	0.015 gm.
Ext. Opii	gr. 1/4	0.03 gm.
Ext. Physostigmatis	gr. 1/8	0.008 gm.
Ext. Rhami Purshianæ	gr. 4	0.25 gm.
Ext. Sumbul	gr. 4	0.25 gm.
Fel Bovis Purificatum	gr. 7 1/2	0.5 gm.
Ferri Arsenas	gr. 1/16 to gr. 1/4	0.004 gm. to 0.016 gm.
Ferri Carbonas Saccharatus	gr. 4	0.25 gm.
Ferri Chloridum	gr. 1	0.065 gm.
Ferri Citras	gr. 4	0.25 gm.
Ferri et Ammonii Citras	gr. 4	0.25 gm.
Ferri et Potassii Tartras	gr. 4	0.25 gm.
Ferri et Quinine Citras Solubilis	gr. 4	0.25 gm.
Ferri Glycerophosphas	gr. 3 to gr. 6	0.2 gm. to 0.4 gm.
Ferri Hypophosphis	gr. 3	0.2 gm.
Ferri Iodidum	gr. 1 to gr. 5	0.06 gm. to 0.3 gm.
Ferri Phosphas Solubilis	gr. 4	0.25 gm.
Ferri Pyrophosphas Solubilis	gr. 4	0.25 gm.
Ferri Sulphas	gr. 3	0.2 gm.
Ferri Sulphas Exsiccatus	gr. 2	0.125 gm.
Ferri Valeras	gr. 3 to gr. 15	0.2 gm. to 1 gm.
Ferrum Reductum	gr. 1	0.065 gm.
Fluidextractum Aconiti	min. 1	0.05 mil.
Fluidextractum Cannabis Indicæ	min. 1	0.05 mil.
Fluidextractum Cascaræ Sagradæ	(See Fluidextractum Rhamni Purshianæ)	
Fluidextractum Cimicifugæ	min. 15	1 mil.
Fluidextractum Cinchonæ	min. 15	1 mil.
Fluidextractum Digitalis	min. 1	0.05 mil.
Fluidextractum Ergotæ	min. 30	2 mils.
Fluidextractum Hamamelidis Foliorum	min. 30	2 mils.
Fluidextractum Hydrastis	min. 30	2 mils.
Fluidextractum Hyoscyami	min. 3	0.2 mil.
Fluidextractum (emetic)	min. 15	1 mil.
Ipecacuanhæ (expectorant)	min. 1	0.05 mil.
Fluidextractum Nucis Vomica	min. 1	0.05 mil.
Fluidextractum Rhamni Purshianæ	min. 15	1 mil.
Fluidextractum Rhamni Purshianæ (Aromaticum).....	min. 15	1 mil.
Gelseminæ Hydrochloridum	gr. 1/120 to gr. 1/130	0.0005 gm. to 0.002 gm.
Glycyrrhizinum Ammoniatum	gr. 4	0.25 gm.
Guaiaicol	min. 8	0.5 mil.
Guaiacolis Carbonas	gr. 15	1 gm.
Guaiacum	gr. 15	1 gm.
Hæmoglobin	gr. 5 to gr. 20	0.3 gm. to 1.3 gm.

TABLE OF DOSES—*Continued.*

	Apothecaries	Metric
Heroin Hydrochloridum.....	gr. 1/25 to gr. 1/6	0.0025 gm. to 0.01 gm.
Hexamethylenamina.....	gr. 4	0.25 gm.
Homatropinæ Hydrobromidum.....	gr. 1/128	0.0005 gm.
Homatropinæ Hydrochloridum.....	gr. 1/80 to gr. 1/20	0.0008 gm. to 0.003 gm.
Homatropinæ Salicylas.....	gr. 1/80 to gr. 1/20	0.0008 gm. to 0.003 gm.
Hydrarg. Chloridum Corrosivum.....	gr. 1/20	0.003 gm.
Hydrarg. Chloridum (laxative).....	gr. 2	0.125 gm.
Hydrarg. Mite (alterative).....	gr. 1	0.065 gm.
Hydrarg. Iodidum Flavum.....	gr. 1/5	0.01 gm.
Hydrarg. Iodidum Rubrum.....	gr. 1/20	0.003 gm.
Hydrarg. Iodidum Viride.....	gr. 1/8 to gr. 1	0.008 gm. to 0.06 gm.
Hydrarg. cum Creta.....	gr. 4	0.25 gm.
Hydrastina.....	gr. 1/5	0.01 gm.
Hydrastinæ Hydrochloridum.....	gr. 1/4 to gr. 1	0.015 gm. to 0.06 gm.
Hydrastininæ Hydrochloridum.....	gr. 1/4	0.03 gm.
Hyoscinæ Hydrobromidum.....	gr. 1/128	0.0005 gm.
Hyoscyamina.....	gr. 1/200 to gr. 1/100	0.0003 gm. to 0.0006 gm.
Hyoscyaminæ Hydrobromidum.....	gr. 1/128	0.0005 gm.
Hyoscyaminæ Sulphas.....	gr. 1/128	0.0005 gm.
Ichthyol.....	gr. 2 1/2 to gr. 10	0.1 gm. to 0.6 gm.
Iodoformum.....	gr. 4	0.25 gm.
Ipecacuanha (expectorant).....	gr. 1	0.065 gm.
Ipecacuanha (emetic).....	gr. 15	1 gm.
Ipecacuanha sine Emetina.....	gr. 10 to gr. 30	0.6 gm. to 2 gm.
Jalapa.....	gr. 15	1 gm.
Kino.....	gr. 7 1/2	0.5 gm.
Leptandra.....	gr. 15	1 gm.
Liquor Acidi Arsenosi.....	min. 3	0.2 mil.
Liquor Ammonii Acetatis.....	fl. dr. 4	16 mils.
Liquor Arseni et Hydrarg. Iodidi (Donovan).....	min. 1 1/2	0.1 mil.
Liquor Calcis.....	fl. dr. 4	16 mils.
Liquor Ferri Chloridi.....	min. 1 1/2	0.1 mil.
Liquor Ferri et Ammonii Acetatis.....	fl. dr. 4	16 mils.
Liquor Iodi Compositus.....	min. 3	0.2 mil.
Liquor Potassii Arsenitis.....	min. 3	0.2 mil.
Liquor Potassii Citratis.....	fl. dr. 4	16 mils.
Liquor Potassii Hydroxidii.....	min. 15	1 mil.
Liquor Sodæ Chlorinatæ.....	min. 15	1 mil.
Liquor Sodii Arsenatis.....	min. 3	0.2 mil.
Liquor Sodii Hydroxidii.....	min. 15	1 mil.
Liquor Sodii Phosphatis Compositus.....	fl. dr. 2	8 mils.
Lithii Benzoas.....	gr. 15	1 gm.
Lithii Bitartras.....	gr. 7 1/2	0.5 gm.
Lithii Bromidum.....	gr. 15	1 gm.
Lithii Carbonas.....	gr. 7 1/2	0.5 gm.
Lithii Citras.....	gr. 7 1/2	0.5 gm.
Lithii Citras Effervescence.....	gr. 120	8 gm.
Lithii Salicylas.....	gr. 15	1 gm.
Lupulinum.....	gr. 7 1/2	0.5 gm.
Magnesii Carbonas.....	gr. 45	3 gm.
Magnesii Oxidum.....	gr. 30	2 gm.
Magnesii Oxidum Ponderosum.....	gr. 30	2 gm.
Magnesii Sulphas.....	gr. 240	16 gm.
Magnesii Sulphas Effervescence.....	gr. 240	16 gm.
Manganii Citras.....	gr. 4	0.25 gm.
Manganii Dioxidum Præcipitatum.....	gr. 4	0.25 gm.

TABLE OF DOSES—*Continued.*

	Apothecaries	Metric
Manganii et Ferri Citras.....	gr. 4	0.25 gm.
Manganii Hypophosphis.....	gr. 3	0.2 gm.
Manganii Sulphas.....	gr. 4	0.25 gm.
Medulla Ossis.....	gr. 15	1 gm.
Menthol.....	gr. 1	0.065 gm.
Morphina.....	gr. 1/5	0.01 gm.
Morphinæ Acetas.....	gr. ¼	0.015 gm.
Morphinæ Hydrochloridum.....	gr. ¼	0.015 gm.
Morphinæ Sulphas.....	gr. ¼	0.015 gm.
Naphthalenum.....	gr. 2	0.125 gm.
Nux Vomica.....	gr. 1	0.065 gm.
Oleum Cajuputi.....	min. 8	0.5 mil.
Oleum Copaiabæ.....	min. 8	0.5 mil.
Oleum Cubebæ.....	min. 8	0.5 mil.
Oleum Eucalypti.....	min. 8	0.5 mil.
Oleum Gaultheriæ.....	min. 15	1 mil.
Oleum Juniperi.....	min. 3	0.2 mil.
Oleum Morrhuæ.....	fl. dr. 4	16 mils.
Oleum Ricini.....	fl. dr. 4	16 mils.
Oleum Sabinæ.....	min. 1	0.05 mil.
Oleum Santali.....	min. 8	0.5 mil.
Oleum Terebinthinæ Rectificatum.....	min. 15	1 mil.
Opium.....	gr. 1 ½	0.1 gm.
Ovarian Substance.....	gr. 7 ½	0.5 gm.
Pancreatinum.....	gr. 7 ½	0.5 gm.
Papainum.....	gr. 4	0.25 gm.
Paraldehydum.....	min. 30	2 mils.
Pelletierinæ Tannas.....	gr. 4	0.25 gm.
Pepsinum.....	gr. 4	0.25 gm.
Phenacetinum.....	gr. 7 ½	0.5 gm.
Phenol.....	gr. 1	0.065 gm.
Phenylis Salicylas.....	gr. 7 ½	0.5 gm.
Phosphorus.....	gr. 1/128	0.0005 gm.
Physostigminæ Hydrobromidum.....	gr. 1/64	0.001 gm.
Physostigminæ Salicylas.....	gr. 1/64	0.001 gm.
Physostigminæ Sulphas.....	gr. 1/64	0.001 gm.
Picrotoxinum.....	gr. 1/60	0.001 gm.
Pilocarpinæ Hydrochloridum.....	gr. 1/5	0.013 gm.
Pilocarpinæ Nitras.....	gr. 1/5	0.013 gm.
Pilocarpus.....	gr. 30	2 gm.
Pilulæ Aloes.....	2 pills	
Pilulæ Aloes et Ferri.....	2 pills	
Pilulæ Aloes et Myrrhæ.....	2 pills	
Pilulæ Asafetidæ.....	2 pills	
Pilulæ Catharticæ Compositæ.....	2 pills	
Pilulæ Catharticæ Vegetabiles.....	2 pills	
Pilulæ Ferri Carbonatis.....	2 pills	
Pilulæ Ferri Iodidi.....	2 pills	
Pilulæ Laxativæ Compositæ.....	2 pills	
Pilulæ Opii.....	1 pill	
Pilulæ Opii et Plumbi.....	1 pill	
Pilulæ Phosphori.....	1 pill	
Pilulæ Podophylli. Belladonnæ et Capsici.....	1 pill	
Pilulæ Rhei Compositæ.....	2 pills	
Piperazinum.....	gr. 7 ½	0.5 gm.
Piperina.....	gr. 3	0.2 gm.
Pix Liquida.....	gr. 7 ½	0.5 gm.
Plumbi Acetas.....	gr. 1	0.065 gm.
Podophyllum.....	gr. 7 ½	0.5 gm.
Potassii Acetas.....	gr. 30	2 gm.
Potassii Bicarbonas.....	gr. 30	2 gm.
Potassii Bitartras.....	gr. 30	2 gm.

TABLE OF DOSES—*Continued.*

	Apothecaries	Metric
Potassii Bromidum.....	gr. 13	1 gm.
Potassii Carbonas.....	gr. 15	1 gm.
Potassii Chloras.....	gr. 4	0.25 gm.
Potassii Citras.....	gr. 15	1 gm.
Potassii Citras Effervescence.....	gr. 60	4 gm.
Potassii Cyanidum.....	gr. 1/5	0.01 gm.
Potassii Dichromas.....	gr. 1/5	0.01 gm.
Potassii et Sodii Tartras.....	gr. 120	8 gm.
Potassii Ferrocyanidum.....	gr. 7½	0.5 gm.
Potassii Hypophosphis.....	gr. 7½	0.5 gm.
Potassii Iodidum.....	gr. 7½	0.5 gm.
Potassii Nitras.....	gr. 7½	0.5 gm.
Potassii Permanganas.....	gr. 1	0.065 gm.
Potassii Sulphas.....	gr. 30	2 gm.
Prostate Gland Substance.....	gr. 4	0.25 gm.
Pulvis Acetanilidi Compositus.....	gr. 7½	0.5 gm.
Pulvis Cretæ Compositus.....	gr. 30	2 gm.
Pulvis Glycyrrhizæ Compositus.....	gr. 60	4 gm.
Pulvis Ipecacuanhæ et Opii.....	gr. 7½	0.5 gm.
Pulvis Jalapæ Compositus.....	gr. 30	2 gm.
Pulvis Morphine Compositus.....	gr. 7½	0.5 gm.
Pulvis Rhei Compositus.....	gr. 30	2 gm.
Quinina.....	gr. 4	0.25 gm.
Quinina Bihydrochloridum.....	gr. 4	0.25 gm.
Quinina Bisulphas.....	gr. 4	0.25 gm.
Quinina Hydrobromidum.....	gr. 4	0.25 gm.
Quinina Hydrochloridum.....	gr. 4	0.25 gm.
Quinina Hypophosphis.....	gr. 2	0.125 gm.
Quinina Phosphas.....	gr. 4	0.25 gm.
Quinina Salicylas.....	gr. 4	0.25 gm.
Quinina Sulphas.....	gr. 4	0.15 gm.
Quinina Valeras.....	gr. 2	0.125 gm.
Residuum Rubrum.....	gr. 5	0.3 gm.
Resina Jalapæ.....	gr. 2	0.125 gm.
Resina Podophylli (Purgative).....	gr. ¼	0.015 gm.
Resina Podophylli (Laxative).....	gr. 1/10	0.005 gm.
Resina Scammonii.....	gr. 3	0.2 gm.
Resorcinol.....	gr. 2	0.125 gm.
Rhamnus Purshiana.....	gr. 15	1 gm.
Rheum.....	gr. 15	1 gm.
Salicinum.....	gr. 15	1 gm.
Salol (see Phenylis Salicylas).....	gr. 15	1 gm.
Santoninum.....	gr. 1	0.065 gm.
Scopolaminæ Hydrobromidum.....	gr. 1/128	0.0005 gm.
"Soamin".....	gr. ½	0.03 gm.
Sodii Acetas.....	gr. 15	1 gm.
Sodii Arsenas.....	gr. 1/10	0.005 gm.
Sodii Arsenas Exsiccatus.....	gr. 1/20	0.003 gm.
Sodii Benzoas.....	gr. 15	1 gm.
Sodii Bicarbonas.....	gr. 15	1 gm.
Sodii Bisulphis.....	gr. 7½	0.5 gm.
Sodii Boras.....	gr. 7½	0.5 gm.
Sodii Bromidum.....	gr. 15	1 gm.
Sodii Cacodylas.....	gr. ¼	0.015 gm.
Sodii Carbonas Monohydratus.....	gr. 4	0.25 gm.
Sodii Chloras.....	gr. 4	0.25 gm.
Sodii Chloridum (as Emetic).....	gr. 240	16 gm.
Sodii Citras.....	gr. 15	1 gm.
Sodii Glycerophosphas.....	gr. 3	0.2 gm.
Sodii Hypophosphis.....	gr. 15	1 gm.
Sodii Iodidum.....	gr. 7½	0.5 gm.
Sodii Nitras.....	gr. 15	1 gm.
Sodii Nitris.....	gr. 1	0.065 gm.

TABLE OF DOSES—Continued.

	Apothecaries	Metric
Sodii Phenolsulphonas	gr. 4	0.25 gm.
Sodii Phosphas	gr. 30	2 gm.
Sodii Phosphas Effervescence	gr. 120	8 gm.
Sodii Phosphas Exsiccatus	gr. 15	1 gm.
Sodii Pyrophosphas	gr. 30	2 gm.
Sodii Salicylas	gr. 15	1 gm.
Sodii Sulphas	gr. 240	16 gm.
Sodii Sulphas Effervescence	gr. 240	16 gm.
Sodii Sulphis	gr. 15	1 gm.
Sodii Sulphocarbolas (see Sodii Phenolsulphonas)		
Sodii Thiosulphas	gr. 15	1 gm.
Sparteinae Sulphas	gr. 1	0.01 gm.
Spigelia	gr. 60	4 gm.
Spiritus Ætheris	fl. dr. 1	4 mils.
Spiritus Ætheris Compositus	fl. dr. 1	4 mils.
Spiritus Ætheris Nitrosi	min. 30	2 mils.
Spiritus Ammoniae	min. 15	1 mil.
Spiritus Ammoniae Aromaticus	min. 30	2 mils.
Spiritus Camphoræ	min. 15	1 mil.
Spiritus Chloroformi	min. 30	2 mils.
Spleen Substance	gr. 7½	0.5 gm.
Strontii Bromidum	gr. 15	1 gm.
Strontii Iodidum	gr. 7½	0.5 gm.
Strontii Salicylas	gr. 15	1 gm.
Strophanthinum	gr. 1/200	0.0003 gm.
Strophanthus	gr. 1	0.065 gm.
Strychnina	gr. 1/64	0.001 gm.
Strychninae Hydrochloridum	gr. 1/64	0.001 gm.
Strychninae Nitrates	gr. 1/64	0.001 gm.
Strychninae Sulphas	gr. 1/64	0.001 gm.
Strychninae Sulphonal (Sulphonmethanum)	gr. 15	1 gm.
Sulphur Præcipitatum	gr. 60	4 gm.
Sulphur Sublimatum	gr. 60	4 gm.
Suprarenal Gland	gr. 5	0.3 gm.
Syrupus Calci Lactophosphatis	fl. dr. 2	8 mils.
Syrupus Ferri Iodidi	min. 15	1 mil.
Syrupus Ferri Quininae et Strychninae Phosphatum	fl. dr. 1	4 mils.
Syrupus Ferri Phosphatis	fl. dr. 1	4 mils.
Syrupus Ferri Phosphatis Compositus	fl. dr. 2	8 mils.
Syrupus Hypophosphitum Compositus	fl. dr. 2	8 mils.
Syrupus Ipecacuanhæ (emetic)	fl. dr. 4	15 mils.
Syrupus Ipecacuanhæ (expectorant)	min. 15	1 mil.
Terebinthum	min. 8	0.5 mil.
Terpini Hydras	gr. 2	0.125 gm.
Thymol	gr. 2	0.125 gm.
Tinctura Aconiti	min. 10	0.6 mil.
Tinctura Aloes	min. 30	2 mils.
Tinctura Aloes et Myrrhæ	min. 30	2 mils.
Tinctura Arnicae	min. 15	1 mil.
Tinctura Asafetidae	min. 15	1 mil.
Tinctura Belladonnae Foliorum	min. 8	0.5 mil.
Tinctura Benzoini	min. 15	1 mil.
Tinctura Benzoini Composita	min. 30	2 mils.
Tinctura Calumbæ	fl. dr. 1	4 mils.
Tinctura Cannabis Indicae	min. 10	0.6 mil.
Tinctura Cantharidis	min. 5	0.3 mil.
Tinctura Capsici	min. 8	0.5 mil.
Tinctura Cimicifugæ	fl. dr. 1	4 mils.
Tinctura Cinchonæ	fl. dr. 1	4 mils.
Tinctura Cinchonæ Composita	fl. dr. 1	4 mils.

TABLE OF DOSES

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TABLE OF DOSES—Continued.

	Apothecaries	Metric
Tinctura Colchici Seminis.....	min. 30	2 mils.
Tinctura Digitalis.....	min. 15	1 mil.
Tinctura Ferri Chloridi.....	min. 8	0.5 mil.
Tinctura Gallæ.....	fl. dr. 1	4 mils.
Tinctura Gambi Composita.....	fl. dr. 1	4 mils.
Tinctura Gelsemii.....	min. 8	0.5 mil.
Tinctura Gentianæ Composita.....	fl. dr. 1	4 mils.
Tinctura Guaiaci Ammoniata.....	min. 30	2 mils.
Tinctura Hamamelidis.....	fl. dr. 1	4 mils.
Tinctura Hydrastis.....	fl. dr. 1	4 mils.
Tinctura Hyoscyami.....	min. 30	2 mils.
Tinctura Iodi.....	min. 1½	0.1 mil.
Tinctura Ipecacuanhæ et Opii.....	min. 8	0.5 mil.
Tinctura Krameria.....	fl. dr. 1	4 mils.
Tinctura Lobelia (expectorant).....	min. 15	1 mil.
Tinctura Lobelia (emetic).....	fl. dr. 1	4 mils.
Tinctura Nucis Vomica.....	min. 10	0.6 mil.
Tinctura Opii.....	min. 8	0.5 mil.
Tinctura Opii Camphorata.....	fl. dr. 2	8 mils.
Tinctura Opii Deodorati.....	min. 8	0.5 mil.
Tinctura Physostigmatis.....	min. 15	1 mil.
Tinctura Scilla.....	min. 15	1 mil.
Tinctura Stramonii.....	min. 8	0.5 mil.
Tinctura Strophanthi.....	min. 8	0.5 mil.
Tinctura Tolutana.....	min. 30	2 mils.
Tinctura Valeriana.....	fl. dr. 1	4 mils.
Tinctura Valerianæ Ammoniata.....	min. 30	2 mils.
Tinctura Veratri.....	min. 30	1 mil.
Tinctura Zingiberis.....	min. 30	2 mils.
Trinitrinum (Nitroglycerinum).....	gr. 1/100	0.00065 gm.
Trional (Sulphonethylmethanum).....	gr. 15	1 gm.
Tropacocainæ Hydrochloridum.....	gr. ½	0.03 gm.
Ulm Fulvæ Mucilago.....	gr. 5	0.3 gm.
Urethane (see Æthylis Carbamas)		
Uranii Nitrates.....	gr. 5	0.3 gm.
Urotropine (see Hexamethylenamina)		
Valeriana.....	gr. 30	2 gm.
Veratrina.....	gr. 1/30	0.002 gm.
Veratrum.....	gr. 2	0.125 gm.
Veronal.....	gr. 5 to gr. 10	0.3 gm. to 0.6 gm.
Viburnum Prunifolium.....	gr. 30	2 gm.
Vinum Antinmœi.....	min. 15	1 mil.
Vinum Colchici Seminis.....	min. 30	2 mils.
Vinum Ergotæ.....	fl. dr. 2	8 mils.
Vinum Ferri.....	fl. dr. 2	8 mils.
Vinum Ferri Amarum.....	fl. dr. 2	8 mils.
Vinum Ipecacuanhæ.....	min. 15	1 mil.
Vinum Opii.....	min. 8	0.5 mil.
Warburg Tincture.....	dr. ½ to dr. 4	1.8 mls to 14 mls.
Zinci Acetas.....	gr. 2	0.125 gm.
Zinci Bromidum.....	gr. 2	0.125 gm.
Zinci Iodidum.....	gr. 1	0.065 gm.
Zinci Oxidum.....	gr. 4	0.25 gm.
Zinci Sulphas (emetic).....	gr. 15	1 gm.
Zinci Valeras.....	gr. 2	0.125 gm.
Zingiber.....	gr. 15	1 gm.

TABLE OF DOSES BY HYPODERMIC

	Apothecaries	Metric
Aconitinæ Nitrates.....	gr. 1/640 to gr. 1/400	0.0001 gm. to 0.00015 gm.
Apomorphinæ Hydrochlor.....	gr. 1/20 to gr. 1/10	0.003 gm. to 0.005 gm.
Atropinæ Sulphas.....	gr. 1/200 to gr. 1/100	0.0003 gm. to 0.0006 gm.

TABLE OF DOSES BY HYPODERMIC—*Continued*

	Apothecaries	Metric
Caffeinæ Sodio-Salicylas.....	gr. $\frac{1}{2}$ to gr. 4.	0.03 gm. to 0.25 gm.
Caffeinæ Sodio-benzoas.....	gr. $\frac{1}{2}$ to gr. 4	0.03 gm. to 0.25 gm.
Cocainæ Hydrochloridum.....	gr. 1/10 to gr. $\frac{1}{2}$	0.005 gm. to 0.03 gm.
Codeinæ Phosphas.....	gr. $\frac{1}{4}$ to gr. 2	0.015 gm. to 0.125 gm.
Cotarinæ Hydrochloridum....	gr. $\frac{1}{4}$ to gr. $\frac{1}{2}$	0.015 gm. to 0.03 gm.
Curara.....	gr. 1/12 to gr. $\frac{1}{4}$	0.005 gm. to 0.03 gm.
Digitalinum (Amorph.).....	gr. 1/100 to gr. 1/30	0.0006 gm. to 0.002 gm.
Ergotinæ Citras.....	gr. 1/200 to gr. 1/50	0.0003 gm. to 0.0013 gm.
Ergotoxina.....	gr. 1/100 to gr. 1/50	0.0003 gm. to 0.0013 gm.
Eucainæ Hydrochloridum.....	gr. 1/10 to gr. $\frac{1}{2}$	0.005 gm. to 0.03 gm.
Eucainæ Laetas.....	gr. 1/10 to gr. $\frac{1}{2}$	0.005 gm. to 0.03 gm.
Heroin Hydrochloridum.....	gr. 1/25 to gr. 1/12	0.0025 gm. to 0.005 gm.
Homatropinæ Hydrochlor....	gr. 1/250 to gr. 1/20	0.00025 gm. to 0.003 gm.
Hydrarg. Chloridum Corrosivum	gr. 1/60 to gr. 1/30	0.001 gm. to 0.002 gm.
Hydrarg. Succinimidum.....	gr. 1/6 to gr. $\frac{1}{4}$	0.011 gm. to 0.015 gm.
Hyoscinæ Hydrobromidum....	gr. 1/200 to gr. 1/100	0.0003 gm. to 0.0006 gm.
Hyoscyaminæ Sulphas.....	gr. 1/200 to gr. 1/100	0.0003 gm. to 0.0006 gm.
Morphinæ Hydrochloridum....	gr. 1/8 to gr. $\frac{1}{4}$	0.008 gm. to 0.015 gm.
Morphinæ Meconas.....	gr. 1/8 to gr. $\frac{1}{4}$	0.008 gm. to 0.015 gm.
Morphinæ Phosphas.....	gr. 1/8 to gr. $\frac{1}{4}$	0.008 gm. to 0.015 gm.
Morphinæ Sulphas.....	gr. 1/8 to gr. $\frac{1}{4}$	0.008 gm. to 0.015 gm.
Morphinæ Tartas.....	gr. 1/8 to gr. $\frac{1}{4}$	0.008 gm. to 0.015 gm.
Physostigminæ Salicylas.....	gr. 1/100 to gr. 1/25	0.0006 gm. to 0.0025 gm.
Picrotoxinum.....	gr. 1/100 to gr. 1/25	0.0006 gm. to 0.0025 gm.
Pilocarpinæ Nitrates.....	gr. 1/20 to gr. $\frac{1}{2}$	0.003 gm. to 0.03 gm.
Potassii Permanganas.....	gr. 1 to gr. 3	0.06 gm. to 0.2 gm.
Quinnæ Bihydrochloridum....	gr. 1 to gr. 5	0.065 gm. to 0.3 gm.
Quinnæ Bisulphas.....	gr. 1 to gr. 5	0.065 gm. to 0.3 gm.
Quinnæ Hydrobromidum.....	gr. $\frac{1}{2}$ to gr. 2	0.03 gm. to 0.125 gm.
"Soamin".....	gr. 1 to gr. 3	0.065 gm. to 0.2 gm.
Sparteine Sulphas.....	gr. $\frac{1}{2}$ to gr. 1	0.03 gm. to 0.065 gm.
Strophanthinum.....	gr. 1/500 to gr. 1/100	0.00013 gm. to 0.0006 gm.
Strychninæ Hydrochloridum...	gr. 1/150 to gr. 1/10	0.0004 gm. to 0.005 gm.
Strychninæ Nitrates.....	gr. 1/150 to gr. 1/10	0.0004 gm. to 0.005 gm.
Strychninæ Sulphas.....	gr. 1/150 to gr. 1/10	0.0004 gm. to 0.005 gm.
Trinitrinum (Nitroglycerinum).	gr. 1/250 to gr. 1/50	0.00025 gm. to 0.0013 gm.

THE NURSE AND THE HARRISON NARCOTIC ACT

An act of Congress which went into effect March 1, 1915, known as the Harrison Act, is a Federal regulation of the sale of narcotic drugs, the purpose being to allow none but properly authorized and responsible persons to sell or have in their possession habit-forming drugs, and to establish a system of tracing all these drugs through legally established channels to the ultimate consumer.

For this purpose annual registration of every wholesale and retail dealer in drugs of this sort is required, a license being issued through the Deputy Collector of Internal Revenue of the District in which the applicant is located. Application is made on specified forms sworn to before a notary, and the registration fee is one dollar.

Physicians and dentists are allowed to prescribe or order these drugs only when registered and when certain conditions are observed. To order narcotics from a druggist for personal use in practice the physician or dentist must obtain a license giving his registry number and must use special blanks furnished by the Department of Internal Revenue, duplicate records of which must be kept. When the wholesale or retail druggist receives this blank, he must file it away, make a record of the sale and furnish the buyer with a duplicate. All these records both by buyer and seller must be kept for a period of two years from date, so that the Internal Revenue Inspectors may examine them when they deem it necessary.

To prescribe any of these drugs for a patient the physician or dentist must use a prescription blank containing the name, age and address of the patient, the prescriber's

registry number and his full name and address and the date of the prescription, which must be dated on the day it is written. This prescription must also be filled on the date it is written. The druggist is required to keep all such prescriptions on a special file for inspection.

The physician is allowed, however, to give single doses of these drugs to a patient without such an order, *but these doses must be given personally*, and a record kept of them.

Any person not so licensed—and *the nurse is not licensed*—who is found to have any of the substances listed under the law in his or her possession, and cannot show that they have been legally placed there by a registered physician's registered prescription, is subject to a fine of \$2000 or five years imprisonment, or both, at the discretion of the court.

It will be seen that the physician has no right to leave morphine tablets in the hands of the nurse for use after he has left, without ordering them on proper blanks through the proper channels, and the nurse has no right to give such medication unless the medicines have been properly registered when purchased.

All dealers, dentists and physicians are obliged to make an inventory return to the Internal Revenue Department each year.

HOSPITALS AND NARCOTIC DRUGS

The hospital nurse finds a certain routine necessary in observing the narcotic law, since hospitals are registered just as physicians are. Physicians are obliged to order drugs either on their own registry blanks or on those containing the hospital number. The ward nurse is required to keep a strict inventory of these drugs used from ward supplies, just as the pharmacist is required to file records of such drugs taken from the pharmacy. Breakage of containers

of liquids or powders entailing waste, should be recorded for the purpose of balancing the inventory at the end of the year. *The purpose of the law is to be able to trace these drugs from the importer to the consumer, and every care should be observed to make this work easy for the Government officials.*

DRUGS AND PREPARATIONS SPECIFIED IN THE NARCOTIC ACT

Opium and coca and its preparations are specified in the Harrison law as follows:

Opium	Coca
Opium—excepting preparations containing 2 grains to the ounce or less.	Coca leaves
Powdered opium	Fluidextract of Coca
Tincture of Opium (Laudanum)	Cocaine and its salts in all tablets and in every combination
Deodorized Tincture of Opium	
Powder of Ipecac and Opium (Dover's Powder)	Codrenin
Morphine and all its salts, excepting preparations containing $\frac{1}{4}$ grain to the ounce or less	Eucaïne
Magendies solution	Holocaine
Codeine and its salts, excepting preparations containing 1 grain or less to the ounce	Novocaine
Dionin	Tropococaine
Codeonal	Anæsthesin
Heroin, excepting preparations containing $\frac{1}{8}$ grain to the ounce or less	Orthoform
Papaverin	
Pantopan	
Apomorphine Hydrochloride	
Stypticin	
Styptol	

Single quantities, or tablets of any of the above preparations of whatever strength, are controlled by the law.

Prescriptions or combinations or preparations containing coca, opium or any derivatives are also included, excepting such as contain opium not more than grain 2 to the ounce, morphine not more than grain $\frac{1}{4}$ to the ounce, codeine not more than grain 1 to the ounce or heroin not more than grain $\frac{1}{8}$ to the ounce. All mixtures or combinations of coca or cocaine or its derivatives are regulated by the law.

Liniments or ointments for external use containing opium or its products are not so regulated, but no exception is made in the case of coca, cocaine or its derivatives.

HOSPITAL SUPPLIES AND ANTISEPTICS USED IN MILITARY SURGERY

PARAFFIN BURN WAX

In addition to the emollient and protective substances (such as petrolatum, lanoline, etc.) used to treat burns, frost bite and other skin ulcerations, the European war has seen the development of several paraffin waxes, known as "Amberine," "burn-wax," etc., of which the No. 7 Paraffin of Lt. Col. Hall, R.A.M.C., is perhaps the best example. Amberine, a proprietary preparation, is paraffin with 5 per cent. oil of amber. Oil of cedar is used in other formulas.

NO. 7 PARAFFIN—HALL

Resorcin (or, Betanaphthol $\frac{1}{4}$ part)	1 part
Oil Eucalyptus	2 parts
Olive Oil	5 parts
Soft paraffin	25 parts
Hard paraffin	67 parts
Absolute alcohol	q. s.

Melt the hard paraffin. Cut up the soft paraffin and stir it in the melted mixture till dissolved, also adding the

olive oil. Add the resorcin dissolved in one-half its weight of absolute alcohol and when the wax has cooled to 133° F., stir in the oil of eucalyptus.

This wax is melted and applied with a camel's-hair brush or sprayed with an atomizer to the ulcerated surface, which must have been previously made dry with a stream of heated air. Cleansing the surface, if infected, with Dakin-Carrel solution or Dichloramine-T solution is a necessary preliminary. A thin layer of the wax is formed over the surface, which is removed when the treatment is repeated.

SOLUTION OF DICHLORAMINE-T

Ten grammes of Dichloramine-T (Abbot Alk. Co.) is dissolved in 75 mls of Chlorinated Eucalyptol. To this is added 100 mls. Chlorinated Liquid Petrolatum (light). This preparation is decomposed by light and heat and should be made up freshly when possible, and not used when over 72 hours old. For use in the nose and throat the above formula should be diluted with 4 parts of Albolene. It is sprayed on wounds with a hand atomizer, or used in the nose with a nebulizer.

DAKIN-CAREL SOLUTION OR HYPOCHLORITE SOLUTION (DAKIN)

- | | |
|---|---------|
| 1. Chlorinated lime (bleaching powder)..... | 200 Gm. |
| Sodium carbonate, dry | 100 Gm. |
| Sodium bicarbonate | 80 Gm. |

2. Put the chlorinated lime in a 12-litre flask with 5 litres of ordinary water, and let it stand over night.

3. Dissolve the sodium carbonate and bicarbonate in 5 litres of cold water.

4. Pour (3) into the flask containing (2), shake it vigorously for a minute, and let it stand to permit the calcium carbonate to settle.

5. After half an hour siphon off the clear liquid and filter it through paper to obtain a perfectly limpid product. This must be kept protected from the light.

The antiseptic solution is then ready for surgical use; it contains about 0.5 gm. per cent. of sodium hypochlorite with small amounts of neutral soda salts; it is practically isotonic with blood serum. It should meet the following tests:

Test.—Put about 20 mls of the solution in a glass and pour on its surface a few centigrams of phenolphthalein in powder; shake it with a circular movement, as in rinsing; the liquid should remain colorless. A more or less marked red discoloration indicates the presence of a notable quantity of free alkali, or incomplete carbonation, imputable to an error in technic.

Errors to Be Avoided.—Never heat the solution. If in an emergency it is necessary to triturate the chlorinated lime in a mortar, do so only with water, never with the solution of the soda salts.

Titration.—To 10 mls of the solution add 10 mls of distilled water, 2 gm. of potassium iodid and 2 mls of acetic acid. Pour into this mixture a decinormal (2.48 per cent.) solution of sodium thiosulphate (hyposulphite) until it is decolorized. The number of cubic centimetres of thiosulphate employed multiplied by 0.003725 equals the percentage of sodium hypochlorite in the solution. (*Jr. A. M. A.*)

HARRINGTON'S SOLUTION

Mercuric chloride	0.8 Gm.
Hydrochloric acid	60.0 mls
Water	300.0 mls
Alcohol	640.0 mls

For hand preparation and skin incision preparation should be preceded by ether and followed by sterile water.

MISCELLANEOUS FORMULAS

TOOTHACHE DROPS (LUNDGREN)

Phenol	2 parts
Menthol	2 parts
Eugenol	1 part

Mix.

FIREPROOFING SOLUTION FOR FABRICS

Boric acid	50 Gm.
Borax	60 Gm.
Water	1000 mls

To be painted on fabrics, or fabrics may be soaked in solution. (Formula of Municipal Laboratory of Paris for use in theatres.)

DEODORIZER FOR SICK ROOM

Coumarin	2 Gm.
Oil lavender	2 mls
Oil bitter almond	4 mls
Oil clove	12 mls
Oil Eucalyptus	16 mls
Oil Patchouli	10 drops

Mix. Use as a spray.

RAUBENHEIMER'S MOTH LIQUID

Phenol	10 Gm.
Camphor	30 Gm.
Carbon tetrachloride, Benzin, of each	.500 mls

This is non-inflammable. Cupboards or chests are to be painted with the liquid, or blotting paper saturated with it. It may also be used as a spray.

DISINFECTANT FOR TELEPHONE MOUTHPIECES (BELLEVUE FORMULARY)

Thymol	2 Gm.
Oil of pine needles,	
Oil of peppermint, of each	2 mls
Alcohol	60 mls
Water, a sufficient quantity.	

To be used in scrubbing telephone mouthpieces.

BLUE WRITING FLUID (*Journ. A. Ph. A.*)

Methylene blue	1 Gm.
Glycerin	5 mls
Water	500 mls

URINE REAGENTS

HAINES SOLUTION (for Sugar Test)

Copper sulphate	2 Gm.
Potassium hydroxide	9 Gm.
Glycerin	20 Gm.
Distilled water to make	175 mls

ROBERT'S REAGENT (for Albumin)

Nitric acid (U. S. P.)	100 mls
Sat. sol. magnesium sulphate	500 mls

LUBRICATING JELLY

(GERMAN HOSPITAL FORMULA)

Tragacanth, whole	3 Gm.
Glycerin	25 mls
Phenol	1.5 Gm.
Distilled water g.s. ad.	300 mls

Break the tragacanth in small pieces and place in a wide-mouthed bottle, add other ingredients and shake the bottle frequently.

LIBRARY PASTE

Wheat flour	4 ounces
Alum, powdered,	1 drachm
Glycerine	6 drachms
Oil winter green	$\frac{1}{2}$ drachm
Water	12 ounces

Blend the flour, water and alum to a smooth paste, boil till paste thickens (avoid burning) and add oil and glycerine and mix thoroughly. Keep in screw-topped jars.

MISCELLANEOUS TOILET PREPARATIONS

PERSPIRATION DEODORANT

Hydrogen dioxide	2 ounces
Spirits of lavender (flowers)	$\frac{1}{4}$ ounce
Alcohol	$\frac{1}{2}$ ounce
Rose water, to make	4 ounces

Mix. Apply when needed.

FOR PERSPIRING FEET

Formalin	4 ounces
Water	1 quart

Mix. Bathe feet at night.

In daytime shake the following powder in shoes:

FOOT POWDER

Sodium perborate	$\frac{1}{8}$ ounce
Powdered starch	$\frac{1}{4}$ ounce
Powdered alum	$\frac{1}{16}$ ounce
Powdered talc	$1\frac{1}{2}$ ounces

Mix and keep in a stoppered bottle.

FOR AXILLARY PERSPIRATION

Potassium bichromate	$\frac{1}{4}$ ounce
Rose water	1 pint

Mix. Apply once or twice a day.

EXTERNAL APPLICATIONS**UNNA'S PASTE (IMPROVED)**

Water	℥x.
Gelatine	℥iv.
Boil until dissolved, add:	
Glycerine	℥x.
Zinc Oxide	℥iv.
Oil Wintergreen	℥i.
Salicylic Acid	℥i.

This paste is heated in a water bath till liquid and painted on the skin with a brush.

Used as a dressing for indolent leg ulcers, warmed and painted on bandage.

LASSAR'S ZINC-SALICYL PASTE

Salicylic Acid	gr.ii.
Zinc Oxide	gr.xxiv.
Starch	gr.xxiv.
White Petrolatum	gr.l (50)

Thoroughly mix the Zinc Oxide with a portion of the petrolatum; then add the Salicylic, the Starch, and the remaining Petrolatum, and triturate until a perfectly smooth mixture is obtained. (Used in eczema of children.)

CALAMINE LOTION (FOX)

Calamine	gr.xl.
Zinc Oxide	gr.xx.
Glycerine	min.xx.
Rose Water	℥i.

Used in acute eczema.

LOTION FOR PRICKLY HEAT

Bismuth subnitrate	℥iij.
Zinc oxid	℥i.
Glycerin	fl.℥iss
Rose water	q. s., ad. fl. ℥vj.

Mix bismuth and zinc with glycerin and rub well. Then add the rose water. Shake well before using.

Sig.: Apply twice a day after the body has been thoroughly cleansed with hot ten per cent. sodium bicarbonate solution.

SURGICAL LIQUID SOAP

Sodium hydrate	40 gms.
Potassium hydrate	40 gms.
Cotton seed oil	500 c.c.
Alcohol	250 c.c.
Distilled water q. s. to make	2500 c.c.

Dissolve the hydrates, preferably in a glass-stoppered bottle, in 250 mls of the distilled water; next add the alcohol and then the cotton-seed oil in three or four portions, shaking vigorously after each addition. Agitate the mixture occasionally until complete saponification has taken place, then add, but not before, the balance of distilled water. (Wilbert.)

EMERGENCY INFANT FEEDING

The new-born infant requires no food for the first 24 hours. Afterward he may be offered 2 ounces of a mixture of one part of boiled milk with two parts of water, 7 feedings at 3-hour intervals. A level teaspoonful of lactose or granulated sugar may be added to the total mixture (14 ounces), increasing by a teaspoonful daily until eight are being given. The tenth day 7 feedings of 3 ounces of a mixture of equal parts of water and boiled milk with one ounce of sugar is offered every 3 hours. All of this will not be taken at first.

After the second week or third week estimate the formula as follows:

1. Weigh the infant.
2. To obtain the quantity of milk needed for the 24-hour

quantity, multiply the weight of the baby by $1\frac{1}{2}$; the result is the number of ounces of milk required. To estimate the quantity required at a feeding, take the age in months and add to it 1, if the feeding interval is three hours; 2 if it is four hours, and this will give the quantity in ounces required at each feeding.

3. To obtain the total quantity of the mixture, multiply the quantity to be given at each feeding by the number of feedings, which number is 7 up to the fifth month, at 3-hour intervals, and 5 after the fifth month at 4-hour intervals.

4. To estimate the quantity of water needed, subtract the number of ounces of milk from the total quantity required for the entire mixture.

5. When a baby weighs 12 pounds or less, 1 ounce of sugar will be sufficient. When it weighs more, the sugar may be proportionally increased to two ounces. The quantity of milk required may gradually be increased from $1\frac{1}{2}$ ounces to 2 ounces per pound of weight in the 24 hours. Sodium bicarbonate $\frac{1}{2}$ a grain to the ounce or lime-water, $\frac{1}{2}$ a drachm to the ounce of the total mixture may be added.

Example.—A baby 3 months old weighs 10 pounds. How should it be fed?

Quantity of milk: 10 times $1\frac{1}{2}$ equals 15 15 ounces milk

Number of feedings: $7 \times (\text{age plus } 1\frac{1}{2} = 4\frac{1}{2}) = 31\frac{1}{2}$ ounces.

Water: $31\frac{1}{2}$ less 15 equals $16\frac{1}{2}$ ounces water to add

Sugar (weight less than 12 pounds) 1 ounce

7 feedings, $4\frac{1}{2}$ ounces at a feeding.

SPECIAL FORMULÆ

ALBUMIN MILK (EIWEISS MILCH)

Milk one quart. Heat to 100° F., and add Essence of Pepsin or Liquezyme one tablespoonful. Set in a warm place for $\frac{1}{2}$ an hour. Then drain through a sterile cheese-

cloth bag for two hours, or until all the whey has dripped off. Throw the whey away.

Press the curd through a fine sieve, using a wooden spoon for the purpose, adding meanwhile one pint of warm water and one pint of buttermilk, and repeat this pressing through the sieve until the curd is broken up into very fine particles. Some authorities at this stage, heat the mixture to about 120° F., causing it to separate, and then repeatedly press it through the sieve, believing that this process prevents coagulation later.

Unless this is done this milk must be given to the infant *very slightly warmed*, else it will coagulate.

A nipple with a specially large orifice must always be used to administer it.

It is usual to add from 3 to 6 per cent. dextri-maltose, Mellin's food or other sugar to this mixture before administering it.

MALT SOUP

To prepare Malt Soup, sometimes called Kellar's Malt Soup, the following formula will prove satisfactory. Malt Soup Extract is obtainable in almost every pharmacy. It is a malt extract rendered slightly alkaline by the addition of carbonate of soda.

Mixture No. 1.—Take 5 tablespoonfuls of Malt Soup Extract and dissolve in 1½ pints of warm water.

Mixture No. 2.—Take 5½ tablespoonfuls of wheat flour, mix with ¾ pint of milk and strain through a clean sieve.

Add mixture No. 2 to mixture No. 1 and boil for 3 minutes, stirring constantly. Cool quickly and pour into clean (preferably sterilized) bottles holding 6 ounces each. Plug them tightly with absorbent cotton, or if corks are used they should be absolutely clean and close-fitting.

Keep in a cool place.

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